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NASCOM NETWORK GROUND COMMUNICATIONS RELIABILITY REPORT

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GROUND COMMUNICATIONS RELIABILITY REPORT
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GSFC

GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

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NASCOM NETWORK

GROUND COMMUNICATIONS RELIABILITY REPORT

February 1973

Prepared by

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GROUND COMMUNICATIONS RELIABILITY REPORT

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NASCOM NETWORK

GROUND COMMUNICATIONS RELIABILITY REPORT

INTRODUCTION

General

The NASCOM Network is a global point-to-point communications systems developed to support manned space flights and unmanned scientific satellite missions. Tracking stations and NASA facilities throughout the world are interconnected by communications satellites, landlines, submarine cables and HF radio circuits. These circuits carry Teletype, voice, and high-speed data in real-time support of missions of the National Aeronautics and Space Administration (NASA) of the United States of America.

The report presents a reliability performance analysis of the NASCOM Network circuits. A Network performance narrative summary is presented first including significant changes in circuit configurations, current month's figures with significant factors, and a discussion of trends in each trouble category with notable circuit totals specified. This is followed by lost time and interruption tables listing circuits which were affected by outages showing their totals by trouble categories. Other tables and graphs present current and prior months' figures on such pertinent subjects as circuit mode totals, network lost time, network reliabilities, numbers of stations and circuits. Then a list is presented, showing the circuits that did not meet the NASCOM performance objectives, followed by a discussion of circuits that fell appreciably below these objectives, i.e., a narrative of individual circuit performance, is given only for those circuits whose reliabilities fell below 95.0% on high-frequency radio and 99.5% on all others. Along with this, a special analysis of circuits whose reliabilities have been low for three months or more is given, with tables depicting three month's performance and graphs of individual path reliabilities.

The performance objectives for the various media established for the network and published in part VII, paragraph 2.4.1 of the NASCOM Data Systems Development Plan are as follows.

- a. Communications Satellite 99.8%
- b. Microwave and landline 99.8%
- c. Submarine cable 99.8%
- d. High-frequency radio 97.0%

Circuits composed of segments that use different media for transmission are evaluated on the basis of the media with the lowest objective. Thus, a circuit that contains a landline and a high-frequency radio segment is expected to perform at 97.0% or better.

Definition of Terms

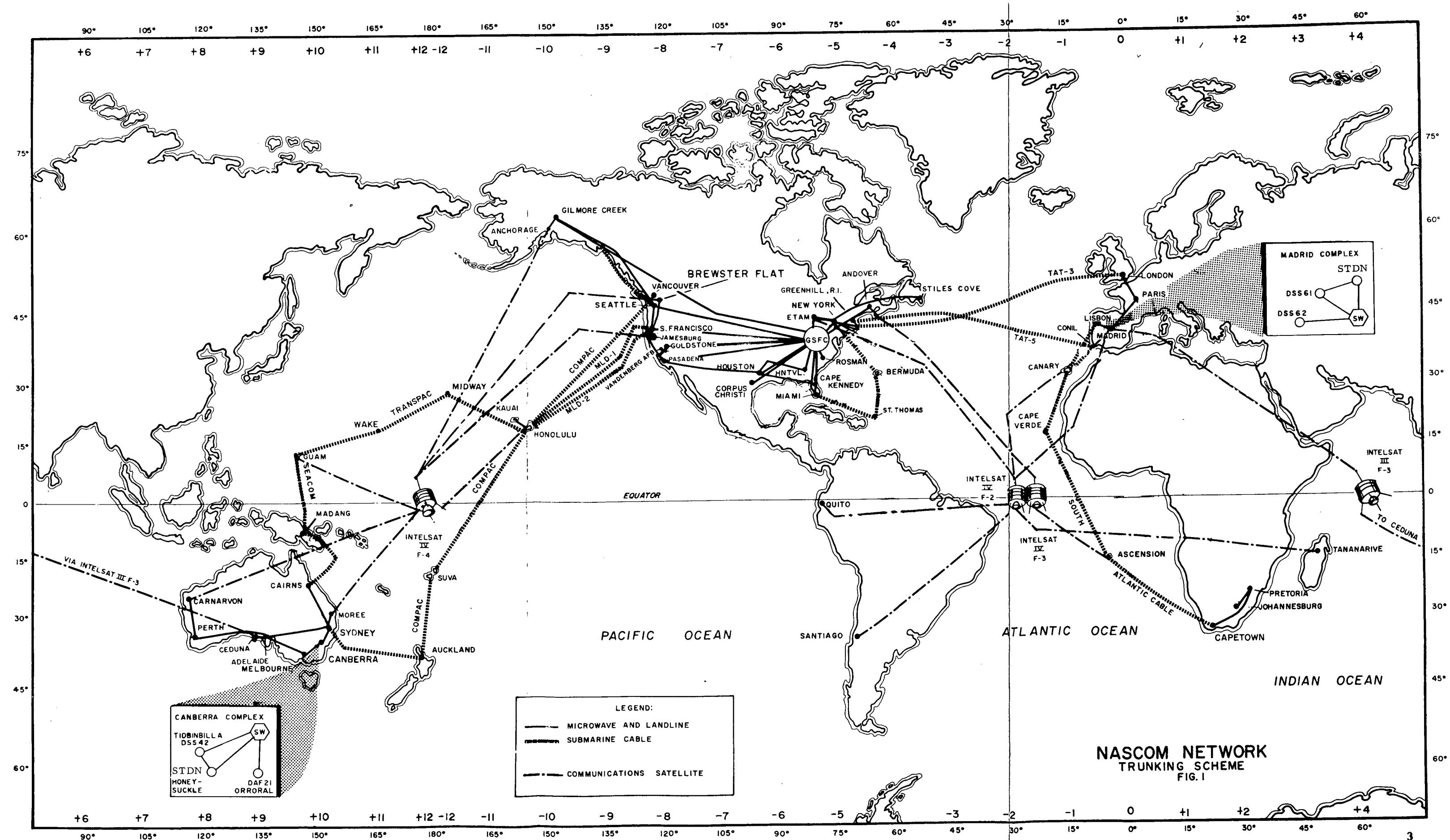
Narrative and tabular data are given in an alphanumeric order by geographic locations. In those tables listing circuit numbers, the station name headings are one of several forms and indicate the circuit's terminal point. Circuits which connect Goddard Space Flight Center (GSFC) with a distant site or NASA switching center are listed under the appropriate geographic name such as "Houston" or "Canberra." Circuits which connect GSFC with more than one terminal location are listed under a joint heading such as "Cape Kennedy & Houston." Those circuits connecting a distant NASA site with a switching center other than GSFC are listed under the distant site's geographic name followed by the location of the switching center. Examples of this are circuits from Madrid to Johannesburg, South Africa which have the heading "Johannesburg/Madrid" and circuits from the Canberra switching center to the Canberra Apollo site which are listed under Canberra Apollo/Canberra. Furthermore, those circuits routed by way of a significant intermediate system are so indicated by notation such as "via COMPAC cable" or "via Satellite" following the appropriate heading.

Operational reliability as used in this report, is defined as the ratio of realized or actual station/circuit or network operating time to the total scheduled operating time, with this ratio then being expressed in percent.

In order to categorize stations/circuits for convenience in comparison, all percentages calculated for the various circuits have been rounded off to the nearest whole number. Thus, a calculated 86.32 percent is entered as 86 percent, and 99.65 percent as 100 percent. It must always be inferred that comparisons are made with figures of the previous month unless a definite statement indicates a comparison with figures of a different period. "Average Reliability" figures listed in Table 4 are based on the months of service shown in that table.

The totals for scheduled operating hours have been rounded off to the nearest hour.

The terms "transmit" and "receive" are used to denote transmission to and reception from a distant terminal point with GSFC or another switching center as the initial point.



FOLDOUT FRAME 1

FOLDOUT FRAME 2

3 /

Data Sources

The data or information used in preparing this report has been obtained from:

Trouble Tickets (GSFC Form 22-35)

NASA Circuit Logs (GSFC Form 28-8T)

Daily Communication Report (DCR)

The Trouble Tickets and Daily Communication Reports provide most of the data or information used. To provide a "common denominator" for recording and interpreting trouble areas, various trouble categories have been devised. Incidents are extracted and classified on this basis, permitting interruption patterns to be determined quantitatively. Category designations are shown in Table 1.

Whenever a discrepancy or an ambiguity appears in the Trouble Tickets or in any of the other data sources listed above, Network Review and Analysis Branch personnel then contact the site or station involved to clarify, correct, or reconcile the data. Comments or questions concerning this report should be directed to Head, Network Review and Analysis Branch, Goddard Space Flight Center, Greenbelt, Maryland 20771, Code 843.

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SUMMARY OF NASCOM NETWORK PERFORMANCE ANALYSIS

The maximum number of circuits utilized during February was 497, 13 less than the prior month. The individual circuit mode totals were 236 for alternate voice/data, 128 for voice-only, 105 for Teletype, 26 data-only, and two voice/facsimile circuits. The net decrease in station/facilities served was one, from 95 to 94.

During the month, 212 circuits incurred interruptions to service during their scheduled operating time and their combined lost service totaled 1,158:56 hours. This represented a decrease of 19 percent over the prior amount of 1,427:35 hours. The lost time was distributed among the five circuit modes with individual totals of 703:15 hours on 116 alternate voice/data circuits, 378:12 hours on 54 Teletype circuits, 54:06 hours on 29 voice-only circuits, 21:28 hours on 12 data-only circuits and 1:55 hours on one voice/facsimile circuit. Interruptions to service decreased from 1,269 to 1,162 and the net result was a decrease in the "Mean Time To Repair" figure from 1:07 to 1:01 hours. Network performance for the current and prior months is listed in Tables 3 and 5 where fluctuations in monthly totals may be noted. The distribution of lost time in each trouble category is shown in Table 7 and the distribution of interruptions in Table 8.

Lost time was distributed in six trouble categories. The largest individual amount was 954:09 hours for commercial carrier failures which accounted for 82.3 percent of the total outage. The other category amounts were 174:51 hours, 15.1 percent for nature faults; 12:19 hours, 1.1 percent for equipment fault/adjustment; 7:21 hours, 0.6 percent for computer fault; 6:34 hours, 0.6 percent for power supply fault, and 3:42 hours, 0.3 percent for RFO unknown.

Seventy of the 212 circuits that incurred outages had operational reliabilities below those specified for their transmission media (as defined on page 1). These involved service to 27 stations and their combined total lost time of 1,016:56 hours represented 88 percent of the network total.

Commercial carrier failures accounted for all or the majority of lost time on 69 of the 70 circuits that failed. These are noted alphabetically by station name in the following paragraphs and, where significant, lesser totals in other categories are given.

Three circuits; CAV-1, 2 and 3, from Grand Canary Island to Ascension Island; had 4:50 hours each. Circuit TGBR-1 from Madrid, Spain to Bretigny-sur-Orge, France had 2:54 hours. Teletype circuit NST-3308 to Cambridge (SAO), Massachusetts had 4:21 hours.

Fourteen circuits serving Australian stations included three to Canberra via satellite; these were GDA-58449, 7:50 hours; GDA-58451, 6:18 hours and GDA-58521 with 4:23 hours. Two others routed via the COMPAC cable to Canberra were GDA-58531 and 58548 with 11:18 and 3:16 hours, respectively. Another pair to Canberra via the M2 and COMPAC cables were GDA-58175 with 7:50 hours and GDA-58547 with 7:47 hours. The eighth was NCT-272 from Canberra to the DAF-21 site at Orroral Valley with 2:50 hours.

The remaining six circuits served Carnarvon and included 2GT-67 from Pasadena WCSC via satellite with 4:30 hours. The other five were from Canberra; NCT-673 and 674 with 3:36 hours each, NCV-622 with 10:54 hours, NCV-624 with 9:20 hours and NCV-631 with 4:12 hours.

Four circuits to Cape Kennedy XY each had 3:14 hours due to commercial carrier faults. These were GD-58418, 58419, GDA-58283 and 58614.

Circuit NST-3304 to Bendix facilities at Columbia, Maryland had 3:00 hours. Two serving Corpus Christi, Texas were GDA-58444 and 58633 with respective totals of 3:46 and 2:38 hours.

Alaskan circuits included three serving Gilmore Creek. GDA-58431 had 4:11 hours and GDA-58432 had 3:55 hours; the third was GDA-58565 via satellite with 29:53 hours.

Three circuits to the Smith Building at Glenn Dale were 74GL-2370 and 2371 with 9:16 hours each and 74GL-2372 with 3:40 hours.

Four circuits serving Grand Canary Island had notable commercial carrier outage totals. On three satellite circuits, these were 77:16, 22:08 and 22:50 hours, respectively, on GDA-58513, 58514 and 58515. The other circuit, CMV-40 from Madrid via Cadiz, had 5:32 hours.

Two circuits to Halethorpe, Maryland were NST-3626 with 3:50 hours and NST-3798-T with 23:20 hours.

Commercial carrier failures represented most of the lost time on the five circuits, AJV-1 through 5, from Ascension Island to Johannesburg, South Africa. Respective totals were 8:19, 10:30, 4:20, 6:37 and 11:14 hours. In addition, AJV-1 through 4 each had 3:08 hours and AJV-5 had 6:40 hours for nature fault.

A total of 4:21 hours were recorded on 2GW-2 from Pasadena WCSC to Boeing at Kent, Washington.

Circuits from Madrid to London included TGPM-2 and 7 with 3:25 and 9:51 hours, respectively.

Two circuits to Madrid included GDA-58655 via satellite with 2:14 hours and GDA-58456 via the TAT-5 cable with 26:07 hours.

The lost times on GDA-58336 and NST-3019-T; from Pasadena WCSC to the Ames Research Center at Moffett Field, California; were 21:26 and 76:26 hours, respectively. Circuit GDA-58620 to Pasadena WCSC had 3:33 hours.

Two satellite circuits to Quito, Ecuador were GDA-58420 with 49:09 hours and GDA-59382 with 73:03 hours. The first circuit also had 6:32 hours for equipment fault.

Seven circuits to Rosman, North Carolina had notable commercial carrier outage totals. These were 21:17 hours on GDA-58152, 9:49 hours on GDA-58437, 11:18 hours on GDA-58448, 2:55 hours on GW-58499, 14:41 hours on NST-3307, 16:29 hours on NST-3316 and 22:16 hours on NST-3317.

Circuits serving Santiago, Chile, GDA-58454, 58488 and 58665 had respective totals of 5:13, 12:13 and 21:14 hours.

Stiles Cove, Newfoundland had three circuits; GDA-58691 with 3:18 hours, GDA-58697 with 5:10 hours and GDA-58698 with 3:18 hours.

Satellite circuits to Tananarive, Malagasy Republic were GDA-58524 with 10:22 hours and GDA-58525 with 13:08 hours. Each also had 2:00 hours for an equipment fault.

Teletype circuit GT-58837 to Waltham, Massachusetts had 5:15 hours.

Nature faults, in the form of flooding, accounted for 143:57 hours on GT-58828 to the USNS Vanguard at Hoboken, New Jersey. Other category contributions were 8:08 hours for commercial carrier and 2:54 hours for power supply faults.

Refer to Tables 1 and 2 for outages and interruptions, respectively, on all circuits and to the discussions following Figure 4 for analysis of significant failures on circuits which were below a reliability criteria of 99.5 percent.

GSFC-494 Switching Computer

Three UNIVAC-494 switching computers, designated as "A", "B" and "C", serve the on-line and off-line operations at the GSFC switching center. These units are alternated on-line as required to switch and control data through the center. No scheduled interruptions to service were necessary during February but three trouble incidents accounted for 5 minutes of outage. The reliability of the switching computer function was 99.99 percent during 672:00 hours of scheduled operation.

On-line operation of the "A" computer was affected for 1 minute on February 17 by a data problem with the Pasadena WCSC. Service was transferred to the "C" computer.

On February 28, memory faults caused 3 minutes of lost time during "B" computer operation and made a switch to the "C" computer necessary.

Operation of the "C" computer incurred a system fault on February 16 that prompted a switch to the "A" computer and a resultant 1-minute outage.

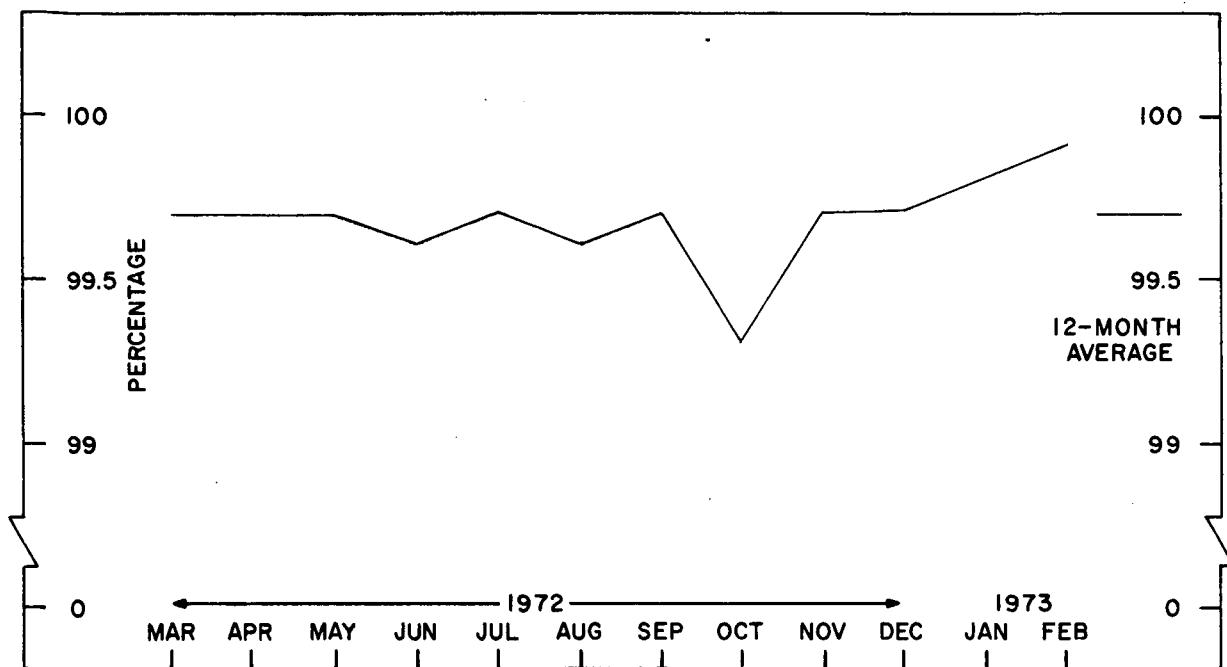


Figure 2. NASCOM Network Reliability for a Period of One Year

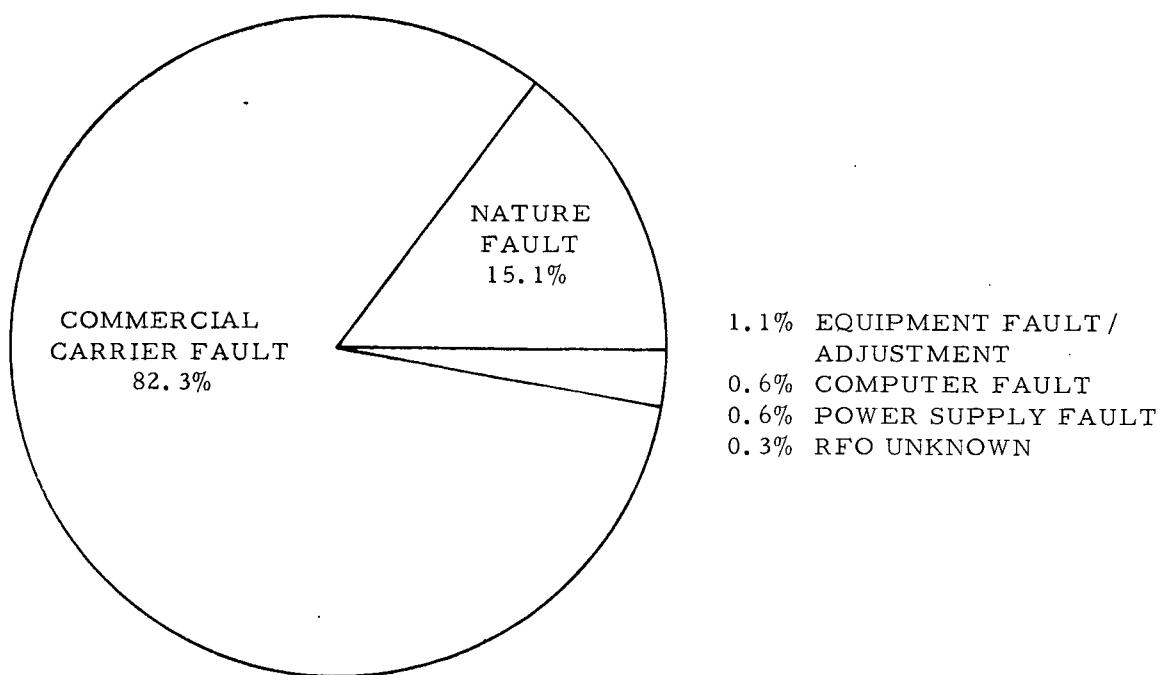


Figure 3. NASCOM Network Percentage of Outage Time by Trouble Categories for the Current Month

Table 1

NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY
Ascension Island via Satellite	GDA-58636	-	:30	-	-	-	-	-	-	:30	1, 344	100
	-58637	-	:41	-	-	-	-	-	-	:41	1, 344	100
	-58638	-	:30	-	-	-	-	-	-	:30	1, 344	100
	-58639	-	:11	-	-	-	-	-	-	:11	1, 344	100
	-58641	-	:11	-	-	-	-	-	-	:11	1, 343	100
Ascension Island/ Grand Canary Island	CAV-1	-	4:50	-	-	-	-	-	-	4:50	1, 008	100
	-2	-	4:50	-	-	-	-	-	-	4:50	1, 344	100
	-3	-	4:50	-	-	-	-	-	-	4:50	1, 344	100
Bermuda Island via New York	GDA-58440	-	-	-	-	:10	-	-	-	:10	1, 344	100
Bermuda Island/Cape Kennedy XY	GT-58901	-	1:32	-	-	:10	-	-	-	1:42	1, 344	100
Bethpage (Grumman)	GT-58396	-	:15	-	-	-	-	-	-	:15	1, 344	100
Bretigny-sur-Orge/ Madrid	GT-58982-T	-	-	-	-	:05	-	-	-	:05	1, 344	100
Cambridge (SAO)	TGBR-1	-	2:54	-	-	-	-	-	-	2:54	1, 344	100
	NST-3174-T	-	-	-	-	:05	-	-	-	:05	672	100
	-3308	-	4:21	-	-	:10	-	-	-	4:31	1, 342	100
Canberra via Satellite	GDA-58449	-	7:50	-	-	-	-	-	-	7:50	1, 344	99
	-58451	-	6:18	-	-	-	-	-	-	6:18	1, 344	100
	-58475	-	1:00	-	-	-	-	-	-	1:00	1, 344	100
	-58504	-	1:08	-	-	:10	-	-	-	1:18	1, 344	100
	-58521	-	4:23	-	-	-	-	-	-	4:23	1, 337	100
Canberra via COMPAC Cable	GDA-58531	-	11:18	-	-	-	-	-	-	11:18	1, 344	99
	-58548	-	3:16	-	-	:10	-	-	-	3:26	1, 344	100
Canberra & Honolulu via M2 & COMPAC Cables	GDA-58175	-	7:50	-	-	-	-	-	-	7:50	1, 344	99
Canberra/Honolulu	-58547	-	7:47	-	-	-	-	-	-	7:47	1, 344	99
Canberra DAF-21 (Orroral Valley)/ Canberra	HU-6	-	2:10	-	-	-	-	-	-	2:10	1, 344	100
Canberra DSCL (Tidbinbilla)/ Canberra	NCT-272	-	2:50	-	-	-	-	-	-	2:50	1, 344	100
Canberra DSCL (Tidbinbilla)/ Canberra	NCT-261	-	-	-	-	-	-	-	:16	:16	1, 344	100
	-264	-	-	-	-	-	-	-	:16	:16	1, 344	100
	NCV-201	-	-	-	-	-	-	-	:18	:18	1, 200	100

Table 1 (Continued)

NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

Table 1 (Continued)

NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY
Cape Kennedy XY & Houston	GP-58681	-	:04	-	-	-	-	-	-	:04	1, 248	100
Cape Kennedy AFS/ Cape Kennedy XY	39GT-2522	-	-	-	-	-	-	-	1:08	1:08	1, 344	100
Carnarvon via Satellite	GDA-58649	-	:15	-	-	-	-	-	-	:15	1, 344	100
	-58651	-	:23	-	-	-	-	-	-	:23	1, 344	100
Carnarvon/Pasadena WCSC via Satellite	2GT-67	-	4:30	-	-	-	-	-	-	4:30	1, 344	100
Carnarvon/Canberra	NCT-673	:06	3:36	-	-	-	-	-	-	3:42	1, 344	100
	-674	:06	3:36	-	-	-	-	-	-	3:42	1, 344	100
	NCV-622	-	10:54	-	-	-	-	-	-	10:54	1, 344	99
	-624	-	9:20	-	-	-	-	-	-	9:20	1, 344	99
	-631	-	4:12	-	-	-	-	-	-	4:12	1, 344	100
Cleveland (Lewis Research Center)	GT-58908	-	-	-	-	:10	-	-	-	:10	1, 344	100
Columbia (Bendix)	NST-3304	-	3:00	-	-	:10	-	-	-	3:10	1, 344	100
Corpus Christi	GDA-58444	-	3:46	-	-	-	-	-	-	3:46	1, 342	100
	-58518	-	1:38	-	-	-	-	-	-	1:38	1, 343	100
	-58633	-	2:38	-	-	:10	-	-	-	2:48	1, 344	100
	GT-58906	-	-	-	-	:10	-	-	-	:10	1, 344	100
	-58907	-	-	-	-	:10	-	-	-	:10	1, 344	100
Gilmore Creek	GDA-58431	:18	4:11	-	-	-	-	-	-	4:29	1, 344	100
	-58432	:18	3:55	-	-	-	-	-	-	4:13	1, 344	100
	GP-58562	:18	2:15	-	-	-	-	-	-	2:33	1, 344	100
	GT-58930	:18	-	-	-	:10	-	-	-	:28	1, 344	100
	-58931	:18	-	-	-	:10	-	-	-	:28	1, 344	100
	GW-52348	:18	:24	-	-	-	-	-	-	:42	1, 343	100
Gilmore Creek via Satellite	GDA-58565	-	29:53	-	-	-	-	-	-	29:53	1, 344	98
Gilmore Creek via Submarine Cable	GFA-58462	-	:57	-	:58	-	-	-	-	1:55	1, 344	100
Glenn Dale (Smith Building)	74GL-2370	-	9:16	-	-	-	-	-	-	9:16	1, 344	99
	-2371	-	9:16	-	-	-	-	-	-	9:16	1, 344	99
	-2372	-	3:40	-	-	-	-	-	-	3:40	1, 344	100

Table 1 (Continued)

NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY
Goldstone	GDA-58461	-	1:56	-	-	-	-	-	-	1:56	1,344	100
	-58584	-	1:56	-	-	:10	-	-	-	2:06	1,335	100
	GT-58868	-	:06	-	-	:10	-	-	-	:16	1,344	100
Grand Canary Island via Satellite	GDA-58513	-	77:16	-	-	-	-	-	-	77:16	847	91
	-58514	-	22:08	-	-	-	-	-	-	22:08	1,344	98
	-58515	-	22:50	-	-	-	-	-	-	22:50	1,109	98
Grand Canary Island/ Madrid via Cadiz	CMV-40	-	5:32	-	-	-	-	-	-	5:32	1,344	100
	-42	-	:54	-	-	-	-	-	-	:54	1,008	100
Grand Canary Island/ Madrid via Lisbon	CMV-41	:02	:52	-	-	-	-	-	-	:54	1,344	100
Guam via Satellite	GDA-58695	-	:45	-	-	-	-	-	-	:45	1,342	100
Guam/Honolulu via TRANSPAC Cable	HU-73	-	:40	-	-	-	-	-	-	:40	1,344	100
	-91	-	:40	-	-	-	-	-	-	:40	1,344	100
	P-319	-	:22	-	-	-	-	-	-	:22	1,344	100
	-1040	-	:22	-	-	-	-	-	-	:22	1,344	100
Halethorpe	NST-3626	-	3:50	-	-	:10	-	-	-	4:00	1,344	100
	-3798-T	-	23:20	-	-	:05	-	-	-	23:25	672	97
Hightstown	NST-3300	-	-	-	-	:10	-	-	-	:10	1,344	100
Hoboken (USNS Vanguard)	GT-58828	-	8:08	-	-	-	-	-	-	154:59	768	80
Honolulu via M1 Cable	GDA-58555	-	:30	-	-	-	-	-	-	:30	1,344	100
	-58556	-	:15	-	-	:10	-	-	-	:25	1,344	100
Honolulu via M2 Cable	GDA-58545	-	:30	-	-	-	-	-	-	:30	1,344	100
Honolulu via Satellite	GDA-58423	-	:05	-	-	-	-	-	-	:05	1,344	100
	-58453	-	:36	-	-	-	-	-	-	:36	1,344	100
	-59362	-	:14	-	-	-	-	-	-	:14	960	100
Houston	GDA-58192	-	:04	-	-	-	-	-	-	:04	1,248	100
	-58281	-	:18	-	-	-	-	-	-	:18	1,248	100
	-58294	-	:58	-	-	-	-	-	-	:58	1,248	100
	-58295	-	:04	-	-	-	-	-	-	:04	1,248	100
	-58612	-	:14	-	-	:10	-	-	-	:24	1,248	100
	GP-58464	-	:04	-	-	-	-	-	-	:04	1,248	100
	-58495	-	:04	-	-	-	-	-	-	:04	1,248	100
	GW-58526	-	:42	-	-	:10	-	-	-	:52	1,248	100

Table 1 (Continued)

NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY
Houston	GW-58527	-	1:14	-	-	:10	-	-	-	1:24	1,248	100
Huntsville	NST-3079	-	1:10	-	-	:10	-	-	-	1:20	1,344	100
Huntsville/Houston	GD-58774	-	:03	-	-	-	-	-	-	:03	1,248	100
	-58777	-	:05	-	-	-	-	-	-	:05	1,248	100
	GP-58256	-	:23	-	-	-	-	-	-	:23	1,248	100
	GW-58725	-	1:22	-	-	-	-	-	-	1:22	1,248	100
Johannesburg/ Ascension Island	AJV-1	-	8:19	-	-	-	-	3:08	-	11:27	1,344	99
	-2	-	10:30	-	-	-	-	3:08	-	13:38	1,344	99
	-3	-	4:20	-	-	-	-	3:08	-	7:28	1,344	99
	-4	-	6:37	-	-	-	-	3:08	-	9:45	1,344	99
	-5	-	11:14	-	-	-	-	6:40	-	17:54	1,344	99
Kennedy Space Center (CD&SC)/Houston	GP-58743	-	:14	-	-	-	-	-	-	:14	1,344	100
Kent (Boeing Corp.)/ Pasadena WCSC	2GW-2	-	4:21	-	-	-	-	-	-	4:21	1,344	100
London via TAT-3 Cable	GDA-58447	-	:22	-	-	-	-	-	-	:22	1,344	100
London/Madrid	DP-2	-	1:31	-	-	-	-	-	-	1:31	1,344	100
	-3	-	1:06	-	-	-	-	-	-	1:06	1,344	100
	-4	-	1:22	-	-	-	-	-	-	1:22	1,344	100
	TGPM-1	-	2:39	-	-	-	-	-	-	2:39	1,344	100
	-2	-	3:25	-	-	-	-	-	-	3:25	1,344	100
	-7	:03	9:51	-	-	-	-	-	-	9:54	1,344	99
Madrid via Satellite	GDA-58605	-	1:24	-	-	-	-	:54	-	2:18	1,344	100
	-58606	-	1:47	-	-	-	-	:54	-	2:41	1,344	100
	-58617	-	1:24	-	-	-	-	:54	-	2:18	1,344	100
	-58654	-	1:24	-	-	-	-	:54	-	2:18	1,344	100
	-58655	-	2:14	-	-	-	-	:54	-	3:08	1,344	100
	-58656	-	1:24	-	-	-	-	:54	-	2:18	1,344	100
	-58657	-	1:24	-	-	-	-	:54	-	2:18	1,344	100
	-58658	-	1:24	-	-	:10	-	:54	-	2:28	1,344	100
	GP-58579	-	1:24	-	-	-	-	:54	-	2:18	1,344	100
	-58603	-	1:45	-	-	-	-	:54	-	2:39	1,344	100
	-58659	-	1:24	-	-	-	-	:54	-	2:18	1,344	100

Table 1 (Continued)
NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY	
Madrid via Satellite	GP-58660	-	1:24	-	-	-	-	:54	-	2:18	1,344	100	
	GW-58530	-	1:24	-	-	-	-	:54	-	2:18	1,344	100	
Madrid via TAT-5 Cable	GDA-58456	-	26:07	-	-	:10	-	-	-	26:17	1,344	98	
	GT-58946	-	:18	-	-	-	-	-	-	:18	1,344	100	
Merritt Island	GDA-58477	-	1:04	-	-	-	-	-	-	1:04	1,344	100	
	-58478	-	1:37	-	-	-	-	-	-	1:37	1,344	100	
	-58501	-	1:29	-	-	-	-	-	-	1:29	1,344	100	
	-58578	-	1:04	-	-	-	-	-	-	1:04	1,344	100	
	-58661	-	1:04	-	-	-	-	-	-	1:04	1,344	100	
	-58663	-	1:04	-	-	-	-	-	-	1:04	1,344	100	
Moffett Field (Ames Research Center)/ Pasadena WCSC	GDA-58336	-	21:26	-	-	-	-	-	-	21:26	1,344	98	
	NST-3004	-	:02	-	-	-	-	-	-	:02	1,344	100	
	-3011-T	-	:02	-	-	-	-	-	-	:02	672	100	
	-3013	-	:02	-	-	-	-	-	-	:02	1,344	100	
	-3014-T	-	:15	-	-	-	-	-	-	:15	672	100	
	-3015-T	-	:02	-	-	-	-	-	-	:02	672	100	
	-3016-T	-	:02	-	-	-	-	-	-	:02	672	100	
	-3019-T	-	76:26	-	-	-	-	-	-	76:26	672	89	
	-3020-T	:05	:02	-	-	-	-	-	-	:07	672	100	
Ottawa	GT-58875	-	-	-	-	:10	-	-	-	:10	1,344	100	
Pasadena WCSC	GDA-58445	-	1:10	-	-	:10	-	-	-	1:20	1,344	100	
	-58490	-	:10	-	-	-	-	-	-	:10	1,344	100	
	-58532	-	:10	-	-	:10	-	-	-	:20	1,344	100	
	-58620	-	3:33	-	-	:10	-	-	-	3:43	1,344	100	
	-58687	-	:34	-	-	-	-	-	-	:34	1,344	100	
	-58694	-	2:19	-	-	-	-	-	-	2:19	1,344	100	
Point Arguello/ Pasadena WCSC	GP-58476	-	:14	-	-	-	-	-	-	:14	1,344	100	
	GP-58792	-	-	-	:29	-	-	-	-	:29	1,344	100	
Prince Albert	GT-58914	-	-	-	-	:10	-	-	-	:10	1,344	100	
Quito via Satellite	GDA-58150	-	:54	-	-	:10	-	-	-	:30	1:34	1,334	100
	-58420	-	49:09	-	6:32	-	-	-	-	55:41	1,332	96	
	-59382	-	73:03	-	-	-	-	-	-	73:03	1,338	95	

Table 1 (Continued)

NASCOM Network Circuit Outage Time by Trouble Category, Scheduled Operating Hours, Reliability Indexes

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY
Riverdale (Calvert & Glenn Dale Buildings)	74GT-644	-	-	-	-	:10	-	-	-	:10	1,344	100
Rosman	GDA-58152	1:14	21:17	-	-	-	-	-	-	22:31	1,344	98
	-58437	-	9:49	-	-	-	-	-	-	9:49	1,344	99
	-58448	-	11:18	-	-	-	-	-	-	11:18	1,342	99
	-58616	-	:22	-	-	-	-	-	-	:22	1,344	100
	GW-52416	-	:58	-	-	-	-	-	-	:58	672	100
	-58499	-	2:55	-	-	-	-	-	-	2:55	1,335	100
	NST-3307	-	14:41	-	-	:10	-	-	-	14:51	1,344	99
	-3316	-	16:29	-	:20	:10	-	-	-	16:59	1,344	99
	-3317	-	22:16	-	-	:10	-	-	-	22:26	1,344	98
Santiago via Satellite	GDA-58454	-	5:13	-	-	-	-	-	-	5:13	1,335	100
	-58488	-	12:13	-	-	:10	-	-	-	12:23	1,342	99
	-58665	-	21:14	-	-	-	-	-	-	21:14	1,344	98
Stiles Cove	GDA-58691	-	3:18	-	-	-	-	-	-	3:18	1,344	100
	-58696	-	:27	-	-	-	-	-	-	:27	1,344	100
	-58697	-	5:10	-	-	-	-	-	-	5:10	1,344	100
	-58698	-	3:18	-	-	-	-	-	-	3:18	1,344	100
Suitland NOAA	GT-58920	-	-	-	-	:10	-	-	-	:10	1,344	100
Tananarive via Satellite	74GT-321	-	-	-	-	:10	-	-	-	:10	1,344	100
	GDA-58524	-	10:22	-	2:00	:10	-	-	-	12:32	1,267	99
	-58525	-	13:08	-	2:00	-	-	-	-	15:08	1,267	99
Valley Forge	GT-58922	-	-	-	-	:10	-	-	-	:10	1,344	100
Vandenberg AFB/ Pasadena WCSC	GDA-58721	:09	-	-	-	-	-	-	-	:09	1,344	100
	-58723	:09	-	-	-	-	-	-	-	:09	1,344	100
Wallops Island	NST-3305-T	-	1:03	-	-	:05	-	-	-	1:08	672	100
	-3313-R	-	1:03	-	-	:06	-	-	-	1:09	672	100
	-3314-R	-	1:03	-	-	:05	-	-	-	1:08	672	100
Waltham (Reservoir)	GT-58837	-	5:15	-	-	:10	-	-	-	5:25	1,344	100
Wheeler AFB/Honolulu	J1-2509	-	:22	-	-	-	-	-	-	:22	1,344	100
Winkfield/London	RLN-2782	-	1:23	-	-	-	-	-	-	1:23	1,344	100

Table 2

NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COM-PUTER FAULT	RF ANOM-ALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Ascension Island via Satellite	GDA-58636 -58637 -58638 -58639 -58641	- - - - -	1 2 1 1 1	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	1 2 1 1 1	:30 :21 :30 :11 :11	
Ascension Island/ Grand Canary Island	CAV-1 -2 -3	- - -	6 6 6	- - -	- - -	- - -	- - -	- - -	6 6 6	:48 :48 :48	
Bermuda Island via New York	GDA-58440	-	-	-	-	6	-	-	-	6	:02
Bermuda Island/Cape Kennedy XY	GT-58901	-	2	-	-	6	-	-	-	8	:13
Bethpage (Grumman)	GT-58396	-	1	-	-	-	-	-	-	1	:15
Bretigny-sur-Orge/ Madrid	GT-58982-T TGBR-1	- -	- 4	- -	- -	3 -	- -	- -	- -	3 4	:02 :44
Cambridge (SAO)	NST-3174-T -3308	- -	- 1	- -	- -	3 6	- -	- -	- -	3 7	:02 :39
Canberra via Satellite	GDA-58449 -58451 -58475 -58504 -58521	- - - - -	8 6 2 2 7	- - - - -	- - - 6 -	- - - -	- -	- -	8 6 2 8 7	:59 1:03 :30 :10 :38	
Canberra via COMPAC Cable	GDA-58531 -58548	- -	14 6	- -	- -	- 6	- -	- -	- -	14 12	:48 :17
Canberra & Honolulu via M2 & COMPAC Cables	GDA-58175 -58547	- -	13 12	- -	- -	- -	- -	- -	- -	13 12	:36 :39
Canberra/Honolulu	HU-6	-	5	-	-	-	-	-	-	5	:26
Canberra DAF-21 (Orroral Valley)/ Canberra	NCT-272	-	1	-	-	-	-	-	-	1	2:50
Canberra DSCC (Tidbinbilla)/ Canberra	NCT-261 -264 NCV-201	- - -	- - -	- - -	- - -	- - -	- - -	2 2 2	2 2 2	:08 :08 :09	

Table 2 (Continued)

NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

Table 2 (Continued)

NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COM-PUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Cape Kennedy XY & Houston	GP-58681	-	1	-	-	-	-	-	-	1	:04
Cape Kennedy AFS/ Cape Kennedy XY	39GT-2522	-	-	-	-	-	-	-	2	2	:34
Carnarvon via Satellite	GDA-58649	-	1	-	-	-	-	-	-	1	:15
	58651	-	1	-	-	-	-	-	-	1	:23
Carnarvon/Pasadena WCSC via Satellite	2GT-67	-	2	-	-	-	-	-	-	2	2:15
Carnarvon/Canberra	NCT-673	2	6	-	-	-	-	-	-	8	:28
	-674	2	6	-	-	-	-	-	-	8	:28
	NCV-622	-	8	-	-	-	-	-	-	8	1:22
	-624	-	6	-	-	-	-	-	-	6	1:33
	-631	-	6	-	-	-	-	-	-	6	:42
Cleveland (Lewis Research Center)	GT-58908	-	-	-	-	6	-	-	-	6	:02
Columbia (Bendix)	NST-3304	-	1	-	-	6	-	-	-	7	:27
Corpus Christi	GDA-58444	-	5	-	-	-	-	-	-	5	:45
	-58518	-	2	-	-	-	-	-	-	2	:49
	-58633	-	2	-	-	6	-	-	-	8	:21
	GT-58906	-	-	-	-	6	-	-	-	6	:02
	-58907	-	-	-	-	6	-	-	-	6	:02
Gilmore Creek	GDA-58431	2	4	-	-	-	-	-	-	6	:45
	-58432	2	2	-	-	-	-	-	-	4	1:03
	GP-58562	2	5	-	-	-	-	-	-	7	:22
	GT-58930	2	-	-	-	6	-	-	-	8	:04
	-58931	2	-	-	-	6	-	-	-	8	:04
	GW-52348	2	3	-	-	-	-	-	-	5	:08
Gilmore Creek via Satellite	GDA-58565	-	10	-	-	-	-	-	-	10	2:59
Gilmore Creek via Submarine Cable	GFA-58462	-	2	-	1	-	-	-	-	3	:38
Glenn Dale (Smith Building)	74GL-2370	-	4	-	-	-	-	-	-	4	2:19
	-2371	-	4	-	-	-	-	-	-	4	2:19
	-2372	-	2	-	-	-	-	-	-	2	1:50

Table 2 (Continued)
NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Goldstone	GDA-58461	-	2	-	-	-	-	-	-	2	:58
	-58584	-	2	-	-	6	-	-	-	8	:16
	GT-58868	-	1	-	-	6	-	-	-	7	:02
Grand Canary Island via Satellite	GDA-58513	-	11	-	-	-	-	-	-	11	7:01
	-58514	-	9	-	-	-	-	-	-	9	2:28
	-58515	-	9	-	-	-	-	-	-	9	2:32
Grand Canary Island/ Madrid via Cadiz	CMV-40	-	15	-	-	-	-	-	-	15	:22
	-42	-	3	-	-	-	-	-	-	3	:18
Grand Canary Island/ Madrid via Lisbon	CMV-41	1	1	-	-	-	-	-	-	2	:27
Guam via Satellite	GDA-58695	-	2	-	-	-	-	-	-	2	:23
Guam/Honolulu via TRANSPAC Cable	HU-73	-	2	-	-	-	-	-	-	2	:20
	-91	-	2	-	-	-	-	-	-	2	:20
	P-319	-	2	-	-	-	-	-	-	2	:11
	-1040	-	2	-	-	-	-	-	-	2	:11
Halethorpe	NST-3626	-	3	-	-	6	-	-	-	9	:27
	-3798-T	-	6	-	-	3	-	-	-	9	2:36
Hightstown	NST-3300	-	-	-	-	6	-	-	-	6	:02
Hoboken (USNS Vanguard)	GT-58828	-	2	-	-	-	-	4	2	8	19:22
Honolulu via M1 Cable	GDA-58555	-	3	-	-	-	-	-	-	3	:10
	-58556	-	1	-	-	6	-	-	-	7	:04
Honolulu via M2 Cable	GDA-58545	-	3	-	-	-	-	-	-	3	:10
Honolulu via Satellite	GDA-58423	-	1	-	-	-	-	-	-	1	:05
	-58453	-	2	-	-	-	-	-	-	2	:18
	-59362	-	1	-	-	-	-	-	-	1	:14
Houston	GDA-58192	-	1	-	-	-	-	-	-	1	:04
	-58281	-	1	-	-	-	-	-	-	1	:18
	-58294	-	2	-	-	-	-	-	-	2	:29
	-58295	-	1	-	-	-	-	-	-	1	:04
	-58612	-	1	-	-	6	-	-	-	7	:03
	GP-58464	-	1	-	-	-	-	-	-	1	:04
	-58495	-	1	-	-	-	-	-	-	1	:04
	GW-58526	-	3	-	-	6	-	-	-	9	:06

Table 2 (Continued)

NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Houston	GW-58527	-	2	-	-	6	-	-	-	8	:11
Huntsville	NST-3079	-	1	-	-	6	-	-	-	7	:11
Huntsville/Houston	GD-58774	-	1	-	-	-	-	-	-	1	:03
	-58777	-	1	-	-	-	-	-	-	1	:05
Johannesburg/ Ascension Island	GP-58256	-	1	-	-	-	-	-	-	1	:23
	GW-58725	-	2	-	-	-	-	-	-	2	:41
	AJV-1	-	21	-	-	-	-	-	-	23	:30
	-2	-	22	-	-	-	-	-	-	24	:34
	-3	-	19	-	-	-	-	2	-	21	:21
	-4	-	20	-	-	-	-	2	-	22	:27
	-5	-	23	-	-	-	-	4	-	27	:40
Kennedy Space Center (CD&SC)/Houston	GP-58743	-	1	-	-	-	-	-	-	1	:14
Kent (Boeing Corp.)/ Pasadena WCSC	2GW-2	-	1	-	-	-	-	-	-	1	4:21
London via TAT-3 Cable	GDA-58447	-	1	-	-	-	-	-	-	1	:22
London/Madrid	DP-2	-	3	-	-	-	-	-	-	3	:30
	-3	-	2	-	-	-	-	-	-	2	:33
	-4	-	2	-	-	-	-	-	-	2	:41
	TGPM-1	-	6	-	-	-	-	-	-	6	:27
	-2	-	7	-	-	-	-	-	-	7	:29
	-7	1	14	-	-	-	-	-	-	15	:40
Madrid via Satellite	GDA-58605	-	5	-	-	-	-	3	-	8	:17
	-58606	-	6	-	-	-	-	3	-	9	:18
	-58617	-	5	-	-	-	-	3	-	8	:17
	-58654	-	5	-	-	-	-	3	-	8	:17
	-58655	-	6	-	-	-	-	3	-	9	:21
	-58656	-	5	-	-	-	-	3	-	8	:17
	-58657	-	5	-	-	-	-	3	-	8	:17
	-58658	-	5	-	-	6	-	3	-	14	:11
	GP-58579	-	5	-	-	-	-	3	-	8	:17
	-58603	-	6	-	-	-	-	3	-	9	:18
	-58659	-	5	-	-	-	-	3	-	8	:17

Table 2 (Continued)

NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Madrid via Satellite	GP-58660	-	5	-	-	-	-	3	-	8	:17
	GW-58530	-	5	-	-	-	-	3	-	8	:17
Madrid via TAT-5 Cable	GDA-58456	-	21	-	-	6	-	-	-	27	:58
	GT-58946	-	2	-	-	-	-	-	-	2	:09
Merritt Island	GDA-58477	-	1	-	-	-	-	-	-	1	1:04
	-58478	-	1	-	-	-	-	-	-	1	1:37
Moffett Field (Ames Research Center)/ Pasadena WCSC	-58501	-	2	-	-	-	-	-	-	2	:45
	-58578	-	1	-	-	-	-	-	-	1	1:04
Moffett Field (Ames Research Center)/ Pasadena WCSC	-58661	-	1	-	-	-	-	-	-	1	1:04
	-58663	-	1	-	-	-	-	-	-	1	1:04
Ottawa	GDA-58336	-	2	-	-	-	-	-	-	2	10:43
	NST-3004	-	1	-	-	-	-	-	-	1	:02
Pasadena WCSC	-3011-T	-	1	-	-	-	-	-	-	1	:02
	-3013	-	1	-	-	-	-	-	-	1	:02
Point Arguello/ Pasadena WCSC	-3014-T	-	2	-	-	-	-	-	-	2	:08
	-3015-T	-	1	-	-	-	-	-	-	1	:02
Point Arguello/ Pasadena WCSC	-3016-T	-	1	-	-	-	-	-	-	1	:02
	-3019-T	-	4	-	-	-	-	-	-	4	19:07
Prince Albert	-3020-T	1	1	-	-	-	-	-	-	2	:04
	GT-58875	-	-	-	-	-	-	-	-	6	:02
Quito via Satellite	GDA-58445	-	5	-	-	6	-	-	-	11	:07
	-58490	-	1	-	-	6	-	-	-	1	:10
Quito via Satellite	-58532	-	1	-	-	6	-	-	-	7	:03
	-58620	-	3	-	-	6	-	-	-	9	:25
Quito via Satellite	-58687	-	1	-	-	-	-	-	-	1	:34
	-58694	-	3	-	-	-	-	-	-	3	:46
Quito via Satellite	GP-58476	-	1	-	-	-	-	-	-	1	:14
	GP-58792	-	-	-	1	-	-	-	-	1	:29
Quito via Satellite	GT-58914	-	-	-	-	6	-	-	-	6	:02
	GDA-58150	-	6	-	-	6	-	-	-	14	:07
Quito via Satellite	-58420	-	8	-	1	-	-	-	-	9	6:11
	-59382	-	14	-	-	-	-	-	-	14	5:13

Table 2 (Continued)

NASCOM Network Circuit Interruptions by Trouble Categories and Mean Time to Repair

STATION	CIRCUIT	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COMPUTER FAULT	RF ANOMALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Riverdale (Calvert & Glenn Dale Buildings)	74GT-644	-	-	-	-	6	-	-	-	6	:02
Rosman	GDA-58152	2	7	-	-	-	-	-	-	9	2:30
	-58437	-	5	-	-	-	-	-	-	5	1:58
	-58448	-	8	-	-	-	-	-	-	8	1:25
	-58616	-	2	-	-	-	-	-	-	2	:11
	GW-52416	-	2	-	-	-	-	-	-	2	:29
	-58499	-	1	-	-	-	-	-	-	1	2:55
	NST-3307	-	16	-	-	6	-	-	-	22	:41
	-3316	-	12	-	1	6	-	-	-	19	:54
	-3317	-	12	-	-	6	-	-	-	18	1:15
Santiago via Satellite	GDA-58454	-	9	-	-	-	-	-	-	9	:35
	-58488	-	15	-	-	6	-	-	-	21	:35
	-58665	-	25	-	-	-	-	-	-	25	:51
Stiles Cove	GDA-58691	-	2	-	-	-	-	-	-	2	1:39
	-58696	-	1	-	-	-	-	-	-	1	:27
	-58697	-	1	-	-	-	-	-	-	1	5:10
	-58698	-	2	-	-	-	-	-	-	2	1:39
	GT-58920	-	-	-	-	6	-	-	-	6	:02
Suitland NOAA	74GT-321	-	-	-	-	6	-	-	-	6	:02
Tananarive via Satellite	GDA-58524	-	19	-	2	6	-	-	-	27	:28
	-58525	-	18	-	2	-	-	-	-	20	:45
Valley Forge	GT-58922	-	-	-	-	6	-	-	-	6	:02
Vandenberg AFB/ Pasadena WCSC	GDA-58721	1	-	-	-	-	-	-	-	1	:09
	-58723	1	-	-	-	-	-	-	-	1	:09
Wallops Island	NST-3305-T	-	1	-	-	3	-	-	-	4	:17
	-3313-R	-	1	-	-	4	-	-	-	5	:14
	-3314-R	-	1	-	-	3	-	-	-	4	:17
Waltham (Reservoir)	GT-58837	-	2	-	-	6	-	-	-	8	:41
Wheeler AFB/Honolulu	J1-2509	-	2	-	-	-	-	-	-	2	:11
Winkfield/London	RLN-2782	-	1	-	-	-	-	-	-	1	1:23

Table 3
NASCOM Network Outage Time and
Reliability Indexes for One Year

TROUBLE CATEGORIES	MAR 1972	APR 1972	MAY 1972	JUN 1972	JUL 1972	AUG 1972
RFO Unknown	8:21	4:27	2:54	1:58	2:39	1:43
Commercial Carrier Fault	1,654:05	1,494:35	1,198:36	1,935:00	1,182:46	1,958:43
Personnel Error	6:12	7:41	4:42	36:01	10:19	:22
Equipment Fault/Adjustment	44:26	38:26	10:33	90:40	35:44	69:35
Computer Fault	41:21	26:36	14:38	8:41	33:25	6:52
Radio Frequency Anomalies	159:59	198:06	172:39	33:44	59:31	287:40
Power Supply Fault	25:32	4:44	5:06	8:42	33:06	6:55
TOTAL OUTAGE	1,939:56	1,774:35	1,409:08	2,114:46	1,357:30	2,331:50
SCHED OPER TIME	597,515	698,553	542,406	515,975	530,410	538,235
RELIABILITY (Percent)	100	100	100	100	100	100

TROUBLE CATEGORIES	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973
RFO Unknown	10:26	2:30	3:04	1:07	7:08	3:42
Commercial Carrier Fault	1,377:31	4,217:09	1,697:30	1,518:24	1,132:29	954:09
Personnel Error	:14	3:26	3:11	5:23	25:46	-
Equipment Fault/Adjustment	57:28	26:16	219:14	23:16	106:38	12:19
Computer Fault	7:56	23:54	10:08	13:48	9:48	7:21
Radio Frequency Anomalies	36:17	20:51	79:41	155:39	135:38	-
Nature Fault	-	-	-	-	-	174:51
Power Supply Fault	2:04	11:00	74:48	93:02	10:08	6:34
TOTAL OUTAGE	1,491:56	4,305:06	2,087:36	1,810:39	1,427:35	1,158:56
SCHED OPER TIME	563,132	596,834	645,026	715,923	694,465	636,601
RELIABILITY (Percent)	100	100	100	100	100	100

Table 4
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Abingon Berkshire (Culham Laboratory/ London)	174LC	100	100	100	100	100	100	100
Arlington Naval Service Center	74GL-1561	100	100	100	100	100	100	100
Ascension Island via Satellite	GDA-58636 - 58637 - 58638 - 58639 - 58640 - 58641 GT-58916 (1) - 58917 (1)	100 100 100 100 100 100 100	100 100 100 100 100 100 100	100 100 100 100 100 99 100	100 100 100 100 100 100 100	100 100 100 100 100 100 100	100 100 100 100 100 100 100	100
Ascension Island/Grand Canary Island	CAV-1 (2) CAV-2 - 3	- 100 100	- 100 100	100 100 100	100 100 100	- 100 100	100 100 100	100
Bermuda Island via Miami	GDA-58428 - 58466	83 100	100 100	100 98	99 100	99 100	100 100	97 100
Bermuda Island via New York	GDA-58440 - 58441 - 58459	100 100 100	100 100 100	100 100 100	100 100 100	100 100 100	100 100 100	100
Bermuda Island/ Cape Kennedy XY	GT-58901 GT-58396	100 100	100 100	100 100	100 100	100 100	100 100	100
Bethpage (Grumman)	GT-58982-T	-	-	-	100	-	100	100
Boulder (NOAA)/ Houston	GDA-58706 (3.) GT-58211-R	100 100	100 100	100 100	100 100	100 100	100 100	100
Bretigny-sur-Orge/ Madrid	TGBR-1	100	100	100	99	100	100	100
Cambridge (ASE)	GDA-58502	100	100	100	100	100	100	100
Cambridge (SAO)	NST-3174-T - 3308	100 99	94 98	100 100	98 100	100 99	100 100	99 99
Cambridge/Houston Canberra via Satellite	GP-58355 (4) GDA-58449 - 58451 - 58475 - 58504 - 58521	100 100 100 100 100 99	100 99 99 99 98 99	100 100 100 100 100 100	100 100 100 100 100 100	100 100 100 100 100 100	100 100 100 100 100 100	100 100 100 100 100 100
Canberra via COMPAC Cable	GDA-58531 - 58548	100 99	100 99	100 99	100 100	100 100	99 100	100

(1) Deactivated February 15

(2) Activated February 1, Deactivated February 21

(3) Upgraded to alternate voice/data mode on August 16

(4) Activated September 2

Table 4 (Continued)
NASCOM Network Circuit Reliability

(1) Activated February 4

(2) Activated February 6

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Canberra (Network Support Facility)/Canberra	NCT-258	100	100	100	100	100	100	100
Cape Kennedy XY	NCV-252	100	100	100	100	100	100	100
	GDA-58283	100	100	100	100	100	100	100
	-58446	100	100	100	100	100	100	100
	-58487	100	100	100	100	100	100	100
	-58614	100	100	100	100	100	100	100
	-58671	100	100	100	100	100	100	100
	-58674	100	100	100	100	100	100	100
	-58675	100	100	100	100	100	100	100
	-59330	100	100	100	100	100	100	100
	-59331	100	100	100	100	100	100	100
	-59332	100	100	100	100	100	100	100
	GD-58418	100	100	100	100	100	100	100
	-58419	100	100	100	100	100	100	100
	-58482	100	100	100	100	100	100	100
	GP-58408	100	100	100	100	100	100	100
	-58409	100	100	100	100	100	100	100
	-58410	100	100	100	100	100	100	100
	-58411	100	100	100	100	100	100	100
	-58412	100	100	100	100	100	100	100
	-58415	100	100	100	100	100	100	100
	-58424	100	100	100	100	100	100	100
	-58534	100	100	100	100	100	100	100
	-58598	100	100	100	100	100	100	100
	-58599	100	100	100	100	100	100	100
	-58600	100	100	100	100	100	100	100
	-58601	100	100	100	100	100	100	100
	-58602	100	100	100	100	100	100	100
Cape Kennedy XY & Houston	GP-58681	100	100	100	100	100	100	100
Cape Kennedy AFS/ Cape Kennedy XY	39GT-2083-T	100	100	100	100	100	100	100
	-2109 (1)	100	100	100	100	100	100	100
	-2163	100	100	100	100	100	100	100
	-2248 (1)	100	100	100	100	100	100	100
	30GT-2315	100	100	100	100	100	100	100
	39GT-2522	100	100	100	100	100	100	100
Carnarvon via Satellite	GDA-58648	100	100	100	100	100	100	100
	-58649	100	100	100	100	100	100	100
	-58650	100	100	100	100	100	100	100
	-58651	100	100	100	100	100	100	100

(1) Deactivated February 12

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Carnarvon/Pasadena	2GT-67	100	100	99	100	100	100	100
WCSC via Satellite	NCV-622	100	100	99	100	100	99	100
Carnarvon/Canberra	-624 (1)	-	-	100	100	100	99	100
	-631	100	100	99	100	100	100	100
	NCT-673	99	99	99	99	99	100	99
	-674	99	99	99	99	99	100	99
Cleveland (Lewis Research Center)	GT-58908	100	100	100	100	100	100	100
	GP-58272	100	100	100	100	100	100	100
Columbia (Bendix)	NST-3304	100	98	100	100	99	100	100
	GP-58416	100	98	100	100	100	100	100
Corpus Christi	GDA-58442 (2)	-	-	100	100	100	100	100
	-58444	100	100	100	100	100	100	100
	-58518	99	99	100	100	100	100	100
	-58633	100	99	100	100	100	100	100
	GT-58906	99	100	100	100	100	100	100
	-58907	99	100	100	100	100	100	100
Datchet/London	T-48407	100	100	96	100	100	100	99
Downey (North American Rockwell)/Houston	GDA-58788	-	-	-	100	-	100	100
	-58789	-	-	-	100	-	100	100
	-58794	-	-	-	100	-	100	100
Downey (North American Rockwell)/Pasadena	2GT-58-T	-	-	-	100	99	100	100
WCSC								
Ent Air Force Base	NST-3081	100	100	100	100	100	100	100
Gilmore Creek	GDA-58431	100	100	100	100	97	100	100
	-58432	100	100	100	100	97	100	100
	GT-58930	100	100	100	100	100	100	100
	-58931	100	100	100	100	100	100	100
	GP-58562 (3)	100	100	100	100	100	100	100
	GW-52348	100	98	100	100	99	100	100
Gilmore Creek via Satellite	GDA-58565	99	100	100	100	100	98	100
Gilmore Creek via Submarine Cable	GFA-58462	99	100	100	100	100	98	100
Glenn Dale	74GD-350	100	100	100	100	100	100	100
	-441	100	100	100	100	100	100	100
	-1132	100	100	100	100	100	100	100
	-1499 (4)	-	100	100	100	100	100	100
	74GL-2370	99	100	100	100	100	99	100
	-2371	100	100	100	100	100	99	100
	-2372	100	100	100	100	100	100	100

(1) Activated November 17

(2) Deactivated December 20, Activated January 22, Deactivated February 20

(3) Deactivated February 28

(4) Activated October 1

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Goldstone	GDA-58460 (1) -58461 -58584 -58585 GT-58867 -58868	- 100 100 100 100 .99	- 100 100 100 100 100	100 100 97 99 100 100	100 100 99 99 100 100	100 100 100 100 100 100	100 100 99 100 100 100	100 100 99 100 100 100
Goldstone/Pasadena WCSC	GDA-58270 -58271 -58276 -58750	100 100 100 100	100 100 100 100	100 100 100 100	100 100 100 100	100 100 100 100	100 100 100 100	100 100 100 100
Grand Canary Island via Satellite	GDA-58513 -58514 -58515	100 100 100	99 100 100	98 98 98	97 98 94	99 100 100	91 98 98	97 99 98
Grand Canary Island/ Madrid via Cadiz	CMV-40 -42 (2)	100 -	100 -	99 100	98 100	99 100	100 100	99 100
Grand Canary Island/ Madrid via Lisbon	CMV-41	99	100	100	100	100	100	100
Guam via Satellite	GDA-58695	100	100	100	100	100	100	100
Guam/Honolulu via TRANSPAC Cable	WUI-156 P-319 -1040 HU-73 -91	100 100 100 100 99	100 100 100 100 100	100 100 100 100 100	100 100 100 100 100	100 100 100 100 100	100 100 100 100 100	100 100 100 100 100
Halethorpe	NST-3626 -3798-T	100 100	97 94	100 100	100 95	100 87	100 98	100 96
Hightstown	GP-58523 GDA-59386 NST-3300 GP-58498	100 100 100 100	100 100 100 100	100 100 96 100	100 100 100 100	100 100 100 100	100 100 99 100	100 100 100 100
Hoboken (USNS Vanguard)	GP-58646 (3) GT-58828 (4)	- -	- -	- -	- -	100 95	100 99	100 97
Holmbury (Mullard Laboratory)/London	695LM 7018LM	- 100	- 100	- 100	- 100	- 97	100 100	100 100
Honolulu via M1 Cable	GDA-58555 -58556	100 100	100 100	100 100	100 100	100 100	100 100	100 100
Honolulu via M2 Cable	GDA-58545	100	100	100	100	100	100	100
Honolulu via Satellite	GDA-58423 -58453 -59362 (5) -59363 (5)	100 100 100 -	99 100 100 -	100 100 100 100	100 100 100 100	100 100 100 100	100 100 100 100	100 100 100 100
Honolulu (AMPAC Build- ing, Bendix)/Honolulu	J1-2530	100	100	100	100	100	100	100

(1) Deactivated December 20, Activated January 22, Deactivated February 20

(2) Deactivated December 19, Activated January 24, Deactivated February 21

(3) Activated January 19, Deactivated February 16

(4) Activated January 18, Deactivated February 16

(5) Deactivated December 20, Activated January 21, Deactivated February 20

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Houston	GDA-58191	100	100	100	100	100	100	100
	-58192	100	100	100	100	100	100	100
	-58281	100	100	100	100	100	100	100
	-58293	100	100	100	100	100	100	100
	-58294	100	99	100	100	100	100	100
	-58295	100	100	100	100	100	100	100
	-58425	100	100	100	100	100	100	100
	-58496	100	100	100	100	100	100	100
	-58497	100	100	100	100	100	100	100
	-58612	100	99	100	100	100	100	100
	-58662	100	99	100	100	100	100	100
	GP-58464	100	100	100	100	100	100	100
	-58495	100	100	100	100	100	100	100
	-58559	100	100	100	100	100	100	100
	-58627	100	100	100	100	100	100	100
	-58678	100	100	100	100	100	100	100
	-58679	100	100	100	100	100	100	100
	-58680	100	100	100	100	100	100	100
	GT-58925	100	100	100	100	100	100	100
	-58959	100	100	100	100	100	100	100
	-58966	100	100	100	100	100	100	100
	GW-58438	100	100	98	100	100	100	100
	-58526	100	99	100	100	100	100	100
	-58527	100	100	100	100	100	100	100
Houston Weather Service/Houston	NST-3076	100	100	100	100	100	100	100
	NSF-3500	100	100	100	100	100	100	100
Huntsville	GT-22115	100	100	100	100	100	100	100
	NST-3079	100	100	100	100	100	100	100
	GP-58465	100	100	100	100	100	100	100
Huntsville/Houston	-58631	100	100	100	100	100	100	100
	GD-58774 (1)	-	-	100	100	100	100	100
	-58775 (2)	-	-	100	100	100	100	100
	-58776 (2)	-	-	100	100	100	100	100
	-58777 (1)	-	-	100	100	100	100	100
	GDA-58255 (1)	-	-	100	100	100	100	100
	GP-58197 (1)	-	-	100	100	100	100	100
	-58198 (1)	-	-	100	100	100	100	100
	-58199 (1)	-	-	100	100	100	100	100
	-58249	100	100	100	100	100	100	100
	-58256 (3)	-	100	100	100	100	100	100
	-58257 (4)	100	100	100	100	100	100	100

(1) Activated November 15

(2) Activated November 16

(3) Activated October 25

(4) Activated September 2

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Huntsville/Houston	GP-58322 (1)	-	100	100	100	100	100	100
	-58323 (1)	-	100	100	100	100	100	100
	-58334 (2)	100	100	100	100	100	100	100
	-58700 (3)	100	100	100	100	100	100	100
	-58702 (3)	100	100	100	100	100	100	100
	GT-58703	100	100	100	100	100	100	100
	GW-58725	100	100	100	100	100	100	100
	AJV-1	100	71	99	99	100	99	95
	-2	100	71	99	99	100	99	95
	-3	100	71	100	99	100	99	95
Johannesburg/ Ascension Island	-4	100	71	99	99	100	99	95
	-5	100	71	99	99	100	99	95
	Kauai Island/Honolulu	R2-2500	100	100	100	100	100	100
		-2501	99	100	100	100	100	100
		-2502	100	100	100	100	100	100
		-2503	100	100	100	100	100	100
		-2507	100	100	100	100	100	100
Kennedy Space Center (Communications Distribution & Switch- ing Center)/Houston	-2509	100	100	100	100	100	100	100
	R3-3500	100	100	99	100	100	100	100
		-3501	100	100	100	100	100	100
		-3503	100	100	100	100	100	100
	GDA-58206	100	100	100	100	100	100	100
	-58338	100	100	100	100	100	100	100
	-58781	100	100	100	100	100	100	100
	-58782	100	100	100	100	100	100	100
	GD-58331 (2)	100	100	100	100	100	100	100
	GT-58724	100	100	99	100	100	100	100
	GP-58200	100	100	100	100	100	100	100
	-58201 (2)	100	100	100	100	100	100	100
	-58203	100	100	100	100	100	100	100
	GR-58204	100	100	100	100	100	100	100
	GP-58207 (2)	100	100	100	100	100	100	100
	-58208 (2)	100	100	100	100	100	100	100
	-58210	100	100	100	100	100	100	100
	-58218	100	100	100	100	100	100	100
	-58223 (2)	100	100	100	100	100	100	100
	-58224 (2)	100	100	100	100	100	100	100
	-58225 (2)	100	100	100	100	100	100	100
	-58239	100	100	100	100	100	100	100
	-58241 (2)	100	100	100	100	100	100	100
	-58248 (2)	100	100	100	100	100	100	100

(1) Activated October 25

(2) Activated September 1

(3) Activated September 2

Table 4 (Continued)
NASCOM Network Circuit Reliability

(1) Activated September 1

(2) Activated September 2

(3) Activated February 21

(4) Activated December 22

(5) Activated November 29

(5) Activated November 29
(6) Activated September 15

(6) Activated September 15
(7) Activated November 6

(7) Activated November 6
(8) Deactivated February 3

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
London via TAT-3 Cable	GDA-58447	99	99	99	100	100	100	100
London University	895LU	100	100	100	100	100	100	100
College/London								
London/Madrid	DP-2	99	100	100	100	100	100	100
	-3	99	95	100	100	100	100	100
	-4	100	100	100	100	99	100	100
	TGPM-1	99	100	100	100	100	100	100
	-2	99	100	100	100	100	100	100
	-7	100	99	100	99	100	99	100
Lynchburg	GP-58673	100	100	100	100	100	100	100
Madrid via Satellite	GDA-58605	98	100	100	100	100	100	100
	-58606	98	100	100	100	100	100	100
	-58617	98	100	100	100	100	100	100
	-58654	98	81	99	100	100	100	96
	-58655	98	100	100	100	100	100	100
	-58656	98	100	100	100	100	100	100
	-58657	98	100	100	100	100	100	100
	-58658	98	100	100	100	100	100	100
	GP-58579	98	100	100	100	100	100	100
	-58603	98	100	100	100	99	100	100
	-58659	98	100	100	100	100	100	100
	-58660	98	100	100	100	100	100	100
	GW-58530	98	100	100	100	100	100	100
Madrid via TAT-5 Cable	GDA-58456	99	99	99	100	99	98	99
	GT-58946	99	100	100	100	99	100	100
Madrid/Canberra via Satellite	NCV-901	(1)	99	100	100	100	100	100
Madrid STDN/Robledo	RMV-50	100	100	100	100	100	100	100
	-51	100	100	100	100	100	100	100
	-52	100	100	100	100	100	100	100
	-53	100	100	100	100	100	100	100
	-54	100	100	100	100	100	100	100
	-55	100	100	100	100	100	100	100
	-56	-	100	100	100	100	100	100
	-57	100	100	100	100	100	100	100
	-58	-	-	-	100	100	100	100
	-59	100	100	100	100	100	100	100
Madrid STDN Wing/ Robledo	RMV-31	-	-	-	-	-	100	100
	-32	-	-	-	-	-	100	100
	-33	-	-	-	-	-	100	100
	-34	-	-	-	-	-	100	100

(1) Deactivated February 28

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Madrid STDN Wing/ Robledo	RMV-35	-	-	-	-	-	100	100
	-36	-	-	-	-	-	100	100
	-37	-	-	-	-	-	100	100
	RMT-5	-	-	-	-	-	100	100
	-6	-	-	-	-	-	100	100
	-7	-	-	-	-	-	100	100
Madrid STDN & Wing/Robledo	RMV-38	-	-	-	-	-	100	100
	-39	-	-	-	-	-	100	100
Madrid DSS-61/Robledo	RMV-61	100	100	100	100	100	100	100
	-62	100	100	100	100	100	100	100
	-63	100	100	100	100	100	100	100
	-64	100	100	100	100	100	100	100
	-65	100	100	100	100	100	100	100
	-66	-	-	-	-	-	100	100
	RMT-11	100	100	100	100	100	100	100
	-13	100	100	100	100	100	100	100
	-14	100	100	-	-	-	100	100
	-15	-	-	-	-	-	100	100
	-16	-	-	-	-	-	100	100
Madrid DSS-62/Robledo	RMV-70	100	100	100	100	100	100	100
	-71	100	100	100	100	100	100	100
	-72	100	100	100	100	100	100	100
	-73	100	100	100	100	100	100	100
	-74	100	100	100	100	100	100	100
	-75	100	100	100	100	100	100	100
	-76	100	100	100	100	100	100	100
Madrid NASA-INTA Office/Robledo	RMV-60	100	100	100	100	100	100	100
Melbourne (Radiation Incorporated)/Cape Kennedy XY	RMT-9	100	100	100	100	100	100	100
	GDA-58404	100	100	100	100	100	100	100
	30GP-6744	100	100	100	100	100	100	100
Merritt Island	GDA-58477	100	99	100	100	100	100	100
	-58478 (1)	-	100	100	100	100	100	100
	-58501 (2)	-	-	-	-	100	100	100
	-58578	100	99	100	100	100	100	100
	-58661 (2)	-	-	-	-	100	100	100
	-58663	100	99	100	100	100	100	100
Merritt Island/Cape Kennedy XY	30GT-2312	100	100	100	100	100	100	100
	-2314	99	100	100	100	100	100	100
	-2328	100	100	100	100	100	100	100

(1) Activated October 20

(2) Activated January 2

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Miami (US Geological Survey)/Cape Kennedy XY	30GT-2330 (1)	-	-	-	-	100	100	100
Moffett Field (Ames Research Center)/ Pasadena WCSC	GDA-58268	100	97	100	100	100	100	100
	-58336	100	100	100	100	100	98	100
	-58632	97	99	100	100	100	100	99
	GP-58226	100	100	100	100	100	100	100
	-58273 (2)	100	100	100	100	100	100	100
	NST-3004	98	100	100	100	100	100	100
	-3011-T	99	100	100	100	100	100	100
	-3013	99	100	100	100	100	100	100
	-3014-T	100	100	100	100	100	100	100
	-3015-T	100	100	100	100	100	100	100
	-3016-T	100	100	100	100	100	100	100
	-3019-T	100	99	100	99	100	89	98
	-3020-T	98	98	100	100	99	100	99
Mojave (ATS)/ Pasadena WCSC	GP-58275 (3)	-	-	-	100	100	100	100
New York (Institute of Space Studies)	GD-58489 (4)	-	-	-	-	100	100	100
New York (RCA)	GP-58414	100	100	100	100	100	100	100
Ottawa	GT-58875	100	100	100	100	100	100	100
Oxford University/ London	104630	100	100	100	100	100	100	100
Palo Alto (Stanford University)/Moffett Field (Ames Research Center)	104631	100	100	100	100	100	100	100
Pasadena WCSC	NST-3022	100	100	100	100	100	100	100
	GDA-58445	100	100	100	100	100	100	100
	-58490	100	100	100	100	100	100	100
	-58491	100	100	100	100	100	100	100
	-58532	100	99	100	100	100	100	100
	-58620	100	100	100	100	100	100	100
	-58623	100	100	100	100	100	100	100
	-58624	100	100	100	100	100	100	100
	-58630	100	100	100	100	100	100	100
	-58666	100	100	100	100	100	100	100
	-58667	99	100	100	100	100	100	100
	-58687	100	100	100	100	100	100	100
	-58692	99	100	99	100	100	100	100
	-58693	100	100	100	100	100	100	100
	-58694	100	100	100	100	100	100	100

(1) Activated January 1

(2) Activated September 15

(3) Deactivated December 20, Activated January 23

(4) Activated January 18

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Pasadena WCSC	GP-58266	100	100	100	100	100	100	100
	-58267	100	100	100	100	100	100	100
	-58435	100	100	100	100	100	100	100
	-58476	99	100	100	100	100	100	100
	-58505	100	100	100	100	100	100	100
	GT-58921	100	100	98	100	100	100	100
Philadelphia (US Geological Survey)	GT-58835 (1)	-	-	100	100	100	100	100
Point Arguello / Pasadena WCSC	2GT-41	100	100	100	100	100	100	100
	GP-58791	100	100	100	100	100	100	100
	-58792	100	100	100	100	100	100	100
	-58793	100	100	100	100	100	100	100
Prince Albert	GT-58914	100	100	100	100	100	100	100
	GP-58610	100	100	100	100	100	100	100
Princeton	GDA-58664	100	100	96	100	100	100	99
	GP-58668	100	100	100	100	100	100	100
Quito via Satellite	GDA-58150 (2)	99	99	100	100	99	100	100
	-58420 (3)	99	98	95	99	100	99	98
	-59382 (2)	100	100	100	100	100	100	100
Riverdale (Calvert & Glenn Dale Buildings	74GT-644	100	100	100	100	100	100	100
Rosman	GDA-58152	100	100	100	99	96	98	99
	-58437	100	100	100	100	100	99	100
	-58448	100	100	100	100	100	99	100
	-58616	100	100	100	100	100	100	100
	GW-52416-R	100	99	100	100	99	100	100
	-58499	100	100	100	100	100	100	100
	NST-3307	100	92	100	99	100	99	98
	-3316	99	91	99	100	99	99	98
	-3317	100	93	98	100	100	98	98
Santiago via Satellite	GDA-58454	98	97	86	99	85	100	94
	-58488	98	96	99	100	96	99	98
	-58665	96	98	79	99	88	98	93
Stiles Cove	GDA-58691	100	100	100	97	100	100	100
	-58696 (4)	-	100	100	100	100	100	100
	-58697 (4)	-	100	99	100	100	100	100
	-58698 (5)	-	-	-	-	100	100	100
	GT-58920	100	100	91	100	100	100	99
Suitland	CGDA-1284	100	100	100	100	100	100	100
	74GT-321	100	100	100	100	100	100	100
Tananarive via Satellite	GDA-58524	99	100	98	93	99	99	98
	-58525	98	100	99	93	99	99	98

(1) Activated November 8

(2) Routed via Satellite September 5

(3) Routed via Satellite September 8

(4) Activated October 19

(5) Activated January 15

Table 4 (Continued)
NASCOM Network Circuit Reliability

STATION	CIRCUIT	SEP 1972	OCT 1972	NOV 1972	DEC 1972	JAN 1973	FEB 1973	AVERAGE RELIABILITY
Torrejon AFB/Madrid Valley Forge	RMV-1	-	-	-	100	-	100	100
	GP-58426	100	100	100	100	100	100	100
	GT-58922	100	100	100	100	100	100	100
Vandenberg AFB	GDA-58405	100	100	100	100	100	100	100
	-58458	100	100	100	100	100	100	100
	-58469	100	100	100	100	100	100	100
Vandenberg AFB/ Pasadena WCSC	GDA-58721	100	100	100	100	100	100	100
	-58722	100	100	100	100	100	100	100
	-58723	100	100	100	100	100	100	100
Wallops Island	GP-58737 (1)	-	-	-	100	100	100	100
	2GT-40	100	100	100	100	100	100	100
	GDA-58299 (2)	-	-	-	-	100	100	100
Waltham (Reservoir)	-58401	100	100	100	100	100	100	100
	-58427	100	100	100	100	100	100	100
	-58540	100	100	100	100	100	100	100
Washington DC NASA Headquarters	-58541	100	100	100	100	100	100	100
	NST-3305-T	100	100	100	100	100	100	100
	-3313-R	100	98	100	100	100	100	99
Washington DC NASA HQ & L'Enfant Plaza	-3314-R	100	93	100	100	100	100	99
	GT-58837 (3)	-	-	99	100	100	100	100
	NST-3306	100	100	100	100	100	100	100
Washington Department of State	74GL-95	100	100	100	100	100	100	100
	-3202-T	100	100	100	100	100	100	100
	74-GS-1599 (4)	-	-	-	-	100	100	100
Washington ITT Wideband Control	74GL-827-T	100	100	100	100	100	100	100
	-828-T	100	100	100	100	100	100	100
	74GL-4840 (5)	-	-	100	100	100	100	100
Washington Naval Research Laboratory	GC-58560	100	100	100	100	100	100	100
	75GD-200	100	100	100	100	100	100	100
	GP-58231 (6)	-	100	100	100	100	100	100
Waterton (Martin- Marietta)/Houston	-58232 (6)	-	100	100	100	100	100	100
	-58233 (6)	-	100	99	100	100	100	100
	J1-2509	100	100	100	100	100	100	100
Wheeler AFB/Honolulu Winkfield/London	RLN-742	100	100	100	100	100	100	100
	-2782	100	100	100	100	100	100	100
	T48395LW	100	100	100	100	100	100	100

(1) Activated December 9

(2) Activated January 5

(3) Activated November 15

(4) Activated January 1

(5) Activated November 29

(6) Activated October 13

Table 5
NASCOM Network Data and Lost Time
for One Year

MONTH	NUMBER OF STATIONS	NUMBER OF CIRCUITS	OUTAGE TIME (Hours and Minutes)	INTERRUPTIONS	MEAN TIME TO REPAIR
Feb (1973)	94	497	1,158:56	1,162	1:01
Jan (1973)	95	510	1,427:35	1,269	1:07
Dec (1972)	101	613	1,810:39	1,669	1:05
Nov (1972)	98	610	2,087:36	1,579	1:19
Oct (1972)	89	507	4,305:06	2,339	1:50
Sep (1972)	86	495	1,491:56	1,834	:48
Aug (1972)	86	466	2,331:50	1,947	1:11
Jul (1972)	85	462	1,357:30	2,152	:37
Jun (1972)	87	472	2,114:46	1,662	1:16
May (1972)	86	475	1,409:08	1,990	:42
Apr (1972)	90	603	1,774:35	2,270	:46
Mar (1972)	85	583	1,939:56	3,041	:38

Table 6
NASCOM Network Circuits by Mode
for One Year

MONTH	ALTERNATE VOICE/DATA	DATA ONLY	TELETYPE	VOICE / FACSIMILE	VOICE ONLY
Feb (1973)	236	26	105	2	128
Jan (1973)	236	26	115	2	131
Dec (1972)	292	31	126	2	162
Nov (1972)	286	33	128	2	161
Oct (1972)	224	27	119	2	135
Sep (1972)	221	27	120	2	125
Aug (1972)	222	24	123	2	95
Jul (1972)	221	21	121	2	97
Jun (1972)	232	21	119	2	98
May (1972)	235	21	120	2	97
Apr (1972)	284	22	133	2	162
Mar (1972)	274	22	132	2	153

Table 7
NASCOM Network Outage Time by Trouble Categories for each Mode of Operation

MODES	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COM-PUTER FAULT	RF ANOM-ALIES	NATURE FAULT	POWER FAILURE	TOTAL LOST TIME	SCHED OPER HOURS	RELIABILITY
Total Alternate Voice/Data	2:10	659:19	-	10:32	2:50	-	26:24	2:00	703:15	308, 552	100
Total Data Only	:18	19:56	-	-	:20	-	:54	-	21:28	33, 350	100
Total Teletype	:56	224:14	-	:20	4:11	-	143:57	4:34	378:12	128, 925	100
Total Voice/Facsimile	-	:57	-	:58	-	-	-	-	1:55	2, 688	100
Total Voice Only	:18	49:43	-	:29	-	-	3:36	-	54:06	164, 431	100
Outage Totals	3:42	954:09	-	12:19	7:21	-	174:51	6:34	1, 158:56	636, 601	100

Table 8
NASCOM Network Interruptions by Trouble Categories for each Mode of Operation

MODES	RFO UNKNOWN	COM CARRIER	PERS ERROR	EQUIP FAULT	COM-PUTER FAULT	RF ANOM-ALIES	NATURE FAULT	POWER FAILURE	TOTAL	MEAN TIME TO REPAIR
Total Alternate Voice/Data	9	571	-	5	102	-	36	12	735	:58
Total Data Only	2	25	-	-	12	-	3	-	42	:31
Total Teletype	10	134	-	1	151	-	4	8	308	1:14
Total Voice/Facsimile	-	2	-	1	-	-	-	-	3	:38
Total Voice Only	2	59	-	1	-	-	12	-	74	:44
Net Totals	23	791	-	8	265	-	55	20	1, 162	1:01

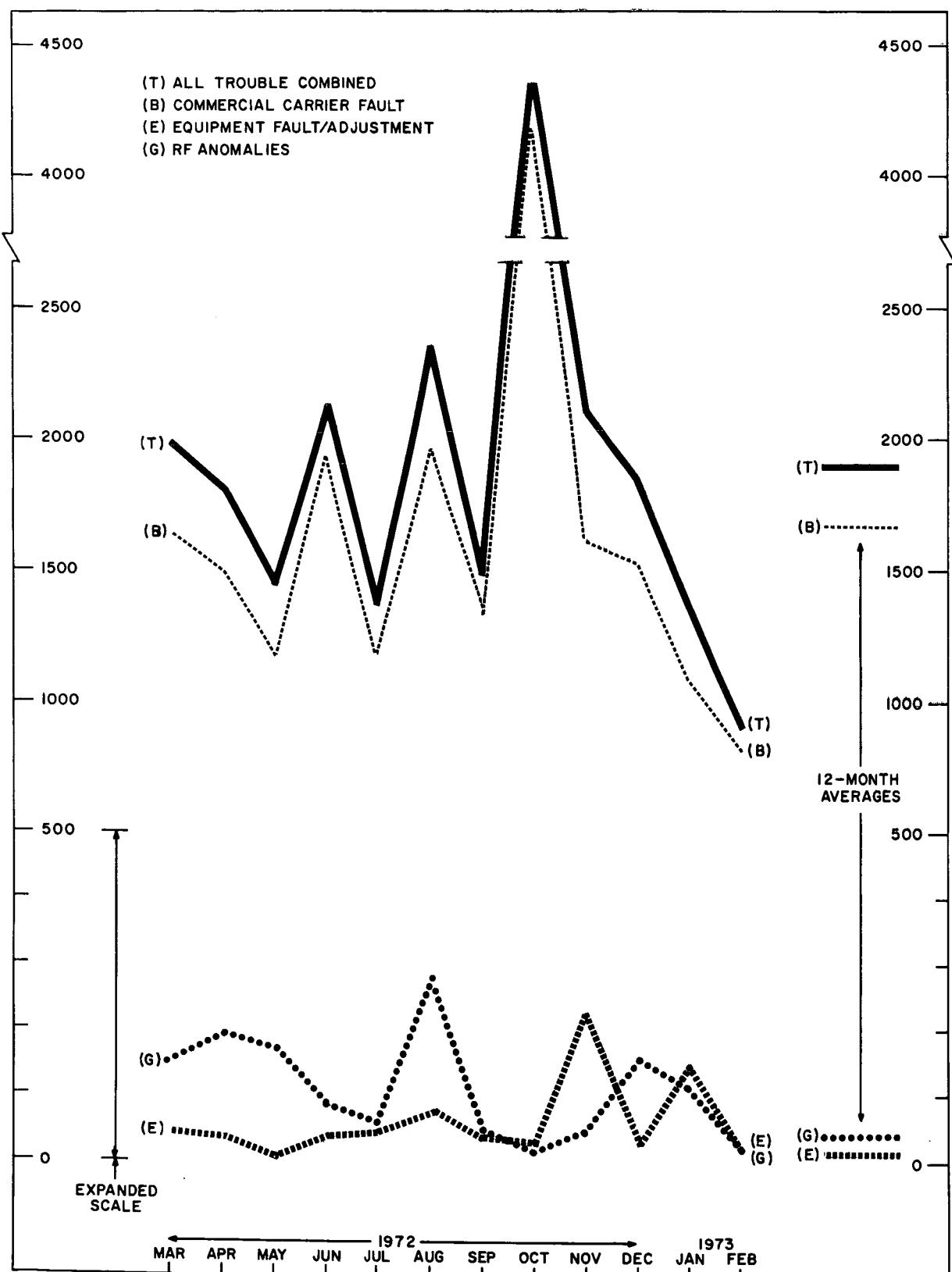


Figure 4. NASCOM Network Lost Time by Trouble Categories for One Year

DISCUSSIONS AND ANALYSES OF PERFORMANCE OF INDIVIDUAL CIRCUITS

General

This section of the NASCOM Network reliability report examines the performance of the circuits, on an individual circuit and station basis, which failed to meet their NASCOM performance objective. The stations are presented in alphabetical order and the circuit discussions are limited to significant outages of 1:00 hour or greater. In addition to a narrative, a table and graph depicting current and prior data and performance are presented for those circuits whose reliabilities have been low for 3 or more consecutive months.

List of Circuits

STATION	CIRCUIT	PERFORMANCE OBJECTIVE	RELIABILITY	DIFFERENCE	MONTHS LISTED
Ascension Island/ Grand Canary Island	CAV-1	99.80	99.52	.28	1
	-2	99.80	99.64	.16	1
	-3	99.80	99.64	.16	1
Bretigny-sur-Orge/ Madrid	TGBR-1	99.80	99.78	.02	4
Cambridge (SAO)	NST-3308	99.80	99.66	.14	3
Canberra via Satellite	GDA-58449	99.80	99.41	.39	1
	-58451	99.80	99.53	.27	6
	-58521	99.80	99.67	.13	6
Canberra via COMPAC Cable	GDA-58531	99.80	99.15	.65	1
	-58548	99.80	99.74	.06	2
Canberra & Honolulu via M2 & COMPAC Cables	GDA-58175	99.80	99.41	.39	1
	-58547	99.80	99.42	.38	1
Canberra DAF-21 (Orroral Valley)/ Canberra	NCT-272	99.80	99.78	.02	1
Cape Kennedy XY	GD-58418	99.80	99.75	.05	1
	-58419	99.80	99.75	.05	1
	GDA-58283	99.80	99.74	.06	1
	-58614	99.80	99.74	.06	1
Carnarvon/Pasadena WCSC via Satellite	ZGT-67	99.80	99.66	.14	5
Carnarvon/Canberra	NCT-673	99.80	99.72	.08	11
	-674	99.80	99.72	.08	10
	NCV-622	99.80	99.18	.62	1
	-624	99.80	99.30	.50	1
	-631	99.80	99.68	.12	1
Columbia (Bendix)	NST-3304	99.80	99.76	.04	2

STATION	CIRCUIT	PERFORMANCE OBJECTIVE	RELIABILITY	DIFFERENCE	MONTHS LISTED
Corpus Christi	GDA-58444	99.80	99.71	.09	1
	-58633	99.80	99.79	.01	1
Gilmore Creek	GDA-58431	99.80	99.66	.14	2
	-58432	99.80	99.68	.12	2
Gilmore Creek via Satellite	GDA-58565	99.80	97.77	2.03	1
Glenn Dale (Smith Building)	74GL-2370	99.80	99.31	.49	2
	-2371	99.80	99.31	.49	2
	-2372	99.80	99.72	.08	2
Grand Canary Island via Satellite	GDA-58513	99.80	90.87	8.93	13
	-58514	99.80	98.35	1.45	6
	-58515	99.80	97.94	1.86	1
Grand Canary Island / Madrid via Cadiz	CMV-40	99.80	99.58	.22	4
Halethorpe	NST-3626	99.80	99.70	.10	1
	-3798-T	99.80	96.51	3.29	3
Hoboken (USNS Vanguard)	GT-58828	99.80	79.81	19.99	2
Johannesburg / Ascension Island	AJV-1	99.80	99.14	.66	1
	-2	99.80	98.98	.82	1
	-3	99.80	99.44	.36	1
	-4	99.80	99.27	.53	1
	-5	99.80	98.66	1.14	1
Kent (Boeing) / Pasadena WCSC	2GW-2	99.80	99.67	.13	1
London/Madrid	TGPM-2	99.80	99.74	.06	2
	-7	99.80	99.26	.54	10
Madrid via Satellite	GDA-58655	99.80	99.76	.04	1
Madrid via TAT-5 Cable	GDA-58456	99.80	98.04	1.76	14
Moffett Field (Ames Research Center) / Pasadena WCSC	GDA-58336	99.80	98.40	1.40	1
Pasadena WCSC	NST-3019-T	99.80	88.62	11.18	1
Quito via Satellite	GDA-58620	99.80	99.72	.08	1
	GDA-58420	99.80	95.82	3.98	7
	-59382	99.80	94.54	5.26	6
Rosman	GDA-58152	99.80	98.32	1.48	3
	-58437	99.80	99.26	.54	1
	-58448	99.80	99.15	.65	1
	GW-58499	99.80	99.78	.02	1
	NST-3307	99.80	98.89	.91	3
	-3316	99.80	98.73	1.07	2
	-3317	99.80	98.33	1.47	2
Santiago via Satellite	GDA-58454	99.80	99.60	.20	14
	-58488	99.80	99.07	.73	2
	-58665	99.80	98.42	1.38	14
Stiles Cove	GDA-58691	99.80	99.75	.05	1
	-58697	99.80	99.61	.19	2

STATION	CIRCUIT	PERFORMANCE OBJECTIVE	RELIABILITY	DIFFERENCE	MONTHS LISTED
Stiles Cove	GDA-58698	99.80	99.75	.05	1
Tananarive via Satellite	GDA-58524 -58525	99.80	99.01	.79	10
Waltham (Reservoir)	GT-58837	99.80	98.80	1.00	4
		99.80	99.59	.21	1

Individual Station Summaries

CANBERRA VIA SATELLITE

Commercial carrier problems were solely responsible for the total lost time of 7:50 hours on GDA-58449 and the resultant reliability of 99 percent. On February 5, a system failure between Newbern, Illinois and Lamar, Colorado caused a transmit path loss of 1:16 hours. PMG personnel at the Canberra Central Exchange performed unauthorized maintenance and caused a 1:15-hour loss on both paths February 15. Faulty group equipment at PMG facilities, Sydney, Australia caused an outage on both paths of 1:39 hours on February 17; this problem was resolved by patching the circuit between Canberra and Sydney.

CANBERRA VIA COMPAC CABLE

A total outage of 11:18 hours on GDA-58531 was attributed to commercial carrier problems and was sufficient to reduce circuit reliability to 99 percent. Three significant disruptions affecting both paths included 1:00 hour on February 4 due to an undetermined problem; faulty group equipment at PMG facilities, Sydney for a 1:39-hour loss of service on February 17 and the third outage, 1:15 hours on February 15, was caused by PMG personnel performing unauthorized maintenance at the Canberra Central Exchange.

CANBERRA & HONOLULU VIA M2 & COMPAC CABLE

As in the case of other circuits serving Canberra, commercial carrier problems were solely responsible for the total lost times of 7:50 and 7:47 hours on GDA-58175 and 58547, respectively. Two significant disruptions, common to both circuits, included 1:15 hours on each February 15 when unauthorized maintenance was performed by PMG personnel at the Canberra Central Exchange and 1:39 hours on February 17 caused by bad group equipment at PMG Sydney. Both paths were affected in each instance.

CARNARVON /CANBERRA

Commercial carrier faults were solely responsible for NCV-622 and 624 not meeting their prescribed performance objective of 99.8 percent. The reliability of each was 99 percent. Unauthorized maintenance performed by PMG personnel at the Canberra Central Exchange disrupted both paths of NCV-622 for 1:15 hours on February 15. Faulty group equipment at PMG facilities in Sydney interrupted service on both paths of NCV-622 for 1:39 hours on February 17. A third outage on NCV-622 was 2:00 hours

February 26 caused by an unspecified problem between NASA facilities and Carnarvon that cleared during investigation.

Coaxial failure in Melbourne caused a loss of 2:30 hours on both paths of NCV-624 February 15. The next day, both paths of the same circuit were affected by a broadband failure between Melbourne, Sydney and Perth. The resultant loss was 1:35 hours.

GILMORE CREEK VIA SATELLITE

The reliability of GDA-58565 decreased from 100 to 98 percent due to commercial carrier failures. Three caused notable interruptions to service. In each of the three instances, the initial symptom was noted as the inability to pass 7.2 kbps data. On February 3, both paths were affected in this manner for 2:00 hours. When the problem was corrected, the cause was given as phase jitter trouble on ATT facilities between Greenbelt, Maryland and Oakland, California. The receive path was out of service for 8:27 hours on February 27 with the first 1:10 hours due to noise on the satellite facilities between Fairbanks, Alaska and Jamesburg, California and the remaining 7:17 hours attributed to an undetermined cause between the same locations. The next day, another undetermined problem on the same segment caused an interruption of 7:35 hours to both paths.

GLENN DALE (SMITH BUILDING)

Two commercial carrier problems were sufficient to reduce the reliability of circuits 74GL-2370 and 2371 to 99 percent. On February 8 double rings on both circuits were corrected after 2:48 hours but no RFO was given. The next day, both circuits would ring in when only one was activated. This was corrected by releasing pick-ups in building 12 at GSFC; the lost times were 1:50 hours on each circuit and, as in the first problem, both paths were affected.

GRAND CANARY ISLAND

Circuits GDA-58514 and 58515 had reliabilities of 98 percent, down from the previous figures of 100 percent. Their receive paths were affected by high impulse noise February 1 on the satellite segment between earth stations at Aguimes, GCI and Etam, West Virginia. The problem was corrected the next day with the report that the circuits were back on normal channels. Lost time on each was 19:30 hours.

On February 11, the transmit path of GDA-58514 had low levels and would not pass 7.2 kbps data. The problem continued for 1:04 hours and no RFO was given. A faulty amplifier at ATT New York-2 was affecting GDA-58513 in a like manner during the same period and may have contributed to this outage.

HOBOKEN (USNS VANGUARD)

For the second consecutive month, GT-58828 failed to meet the desired level of performance. The 80 percent reliability this month is attributed to reduced scheduled operating hours, 384:00, and a notable increase in total loss time from 32:14 hours to 154:59 hours. During this report period, the circuit incurred five significant disruptions, three of which were due to flooded cables in Hoboken, New Jersey. These included 63:40 hours between February 3 and February 6 on the transmit path and

62:17 hours on the receive. Later, on February 6, both paths were again reported out of service for a similar problem. ATT personnel investigated and found the condition to be "flooded manholes" between the shipyard at Hoboken and the frame room at ATT. The resultant loss continued into February 7 for a total of 9:00 hours. A bad repeater on ATT facilities in Hoboken caused an interruption of 4:04 hours that affected both paths on February 1. The fifth significant disruption occurred on February 10/11 when a power failure on board the USNS Vanguard disrupted both paths for 1:27 hours.

JOHANNESBURG /ASCENSION ISLAND

The five circuits serving these stations, AJV-1 through 5 each had reliabilities of 99 percent. Significant disruptions common to all circuits included 1:34 hours on February 6 when storms in South Africa disrupted service on both paths of each; a bad group between Welkom and Johannesburg caused a 1:26-hour loss on both paths of each February 8.

Other disruptions affecting both paths of the individual circuits included 1:10 hours on AJV-2 and 1:40 hours on AJV-5. Microwave trouble between Johannesburg and Bloemfontein was responsible for these February 12 outages. The receive paths of AJV-1, 4 and 5 were affected by an unknown problem for 2:17 hours on February 4. The receive paths of AJV-1 and AJV-5 would not pass 7.2 kbps data on February 20. No reason for the problem was established and the resultant losses were 1:42 hours on AJV-1 and 1:17 hours on AJV-5. A faulty equalizer at Capetown interrupted service on the transmit path of AJV-2 for 3:50 hours on February 19. Both paths of AJV-5 were lost for 1:46 hours on February 6 reportedly due to bad weather in South Africa.

LONDON /MADRID

Circuit TGPM-7 had a reliability of 99 percent due primarily to commercial carrier failures with lost times ranging from 5 to 57 minutes, and a combined amount of 9:51 hours.

MADRID VIA TAT-5 CABLE

The reliability of GDA-58456 decreased from 99 to 98 percent due, for the most part, to an increase of over 50 percent in commercial carrier lost time. The longest interruption to service occurred on February 23 when the receive path would not pass 7.2 kbps data for 7:08 hours. When service was restored, carrier personnel reported no trouble was found. Prior to that problem, a total outage of 6:29 hours occurred on both paths February 21. The initial symptoms were low levels and intermittent opens. The first 1:07 hours were attributed to a cable trouble at Madrid, the next 45 minutes were caused by a faulty carrier system between New York and GSFC, then 1:16 hours were used in checking impulse noise and the last 3:21 hours were due to a power supply failure between Puertollano and Montoro, Spain. On February 5, a faulty carrier system at Madrid caused an open circuit condition on the transmit path for 1:01 hours.

MOFFETT FIELD (AMES RESEARCH CENTER) /PASADENA WCSC

The total lost times of 21:26 hours on GDA-58336 and 76:26 hours on NST-3019-T were attributed to commercial carrier problems. Significant disruptions affecting GDA-58336 included 12:10 hours on February 16/17 due to a reported high error rate,

the cause of which was not found and a bad "T" carrier between Mountain View and San Francisco for 9:16 hours on February 22. Both outages were recorded on the transmit path.

On February 6, NST-3019-T was disrupted when a leased cable failed between Los Angeles and Pasadena. The circuit was restored by using other facilities between the above locations and the resultant loss was 69:39 hours. A defective repeater card at Mountain View, California caused an open condition and a disruption of 2:30 hours on February 13. A third fault was an open condition on February 6 for 4:15 hours. No cause was determined for the problem.

Resultant reliabilities were 98 percent on GDA-58336 and 94 on NST-3019-T.

QUITO VIA SATELLITE

The reliability of circuit GDA-58420 decreased from 100 to 96 percent due primarily to increased commercial carrier outage. Most of this was recorded on the receive path. On February 1, high block errors caused an outage of 1:16 hours with no cause found for the problem. The next major commercial carrier outage occurred February 22 when the same path had noise and would not pass 7.2 kbps data. The cause was traced to adjacent channel interference by a carrier system from France. The resulting lost time was 2:36 hours. On February 25 the receive path again would not pass 7.2 kbps data. Service was affected for 4:18 hours with no cause determined. A fourth major failure began on February 27 when the receive path was unable to pass 7.2 kbps data. RCA at New York advised GSFC that IMC at Quito is unmanned between 1200 and 2400Z daily and that this would serve to prolong the interruption to service. The interruption continued until March 1. Investigation during the outage placed the trouble between the earth stations at Etam, West Virginia and Quito. Subsequent problems including power failures extended and complicated the investigation so that 40:11 hours of lost time were recorded in February. The RFO was given as feedover from adjacent channels on the satellite segment.

Low levels on the transmit path were the beginning of a 6:32-hour outage on February 23/24. This was attributed to an on-site line trouble at Quito.

ROSMAN

Lost time due to commercial carrier problems caused reliabilities of 99 percent on circuits GDA-58437, 58448, NST-3307 and 3316. A fifth circuit, NST-3317 was 98 percent.

Two notable common failures affected the receive paths of the alternate voice/data circuits. On February 5, circuit GDA-58448 was logged out of service at 1435Z and, 40 minutes later, similar symptoms were noted on GDA-58437. Both circuits were restored at 2206Z after outages of 7:30 hours on the first circuit and 6:51 hours on the other. The cause was given as trouble on ground and cable carrier between Asheville and Brevard, North Carolina. The other common fault occurred on February 7 when the same path would not pass 7.2 kbps data. An outage of 2:29 hours was recorded before the unknown problem, located between Asheville and Rosman, cleared during investigation.

The three Teletype circuits also had common problems that occurred on February 5. At 1852Z, garbling and an intermittent open condition affected both paths of these circuits. The outage ticket was closed at 1954Z, after interruptions of 1:02 hours on each circuit, and another ticket initiated at the same time. The symptom reported on the second ticket was "hitting up" and this cleared after 2:20 hours with no cause determined. A common symptom of open in both directions was noted on these circuits on February 7. NST-3307 was restored after 53 minutes by adjustment of bias; NST-3316 was back after 2:38 hours with the cause specified as a faulty channel at Charlotte, North Carolina and NST-3317 was affected for 6:38 hours before the problem cleared during investigations.

Three other notable failures included a line trouble between Asheville and Charlotte that affected both paths of NST-3316 for 3:18 hours and an open on NST-3307 for 1:10 hours on February 22. This latter problem affected both paths and was attributed to an in-house trouble at WUT Washington, D. C. Circuit NST-3307 was out of service on the transmit path for 1:15 hours February 28 while WUT realigned the circuit between Nashville, Tennessee and Atlanta, Georgia.

SANTIAGO VIA SATELLITE

A reduction in lost time due to commercial carrier failures was responsible for an increase in reliability from 96 to 99 percent on GDA-58488. Of 13 failures in this category during February, four caused notable interruptions to the receive path. On February 5, an open condition between ATT and ITT facilities in New York caused a 1:52-hour outage. Two problems occurred on February 13. First, a noise condition was caused by microwave trouble between El Roble Hill and Santiago, Chile and resulted in a 1:24 hour interruption. Following this, high levels were caused by a problem on ATT facilities between Greenbelt, Maryland and New York. The lost time was 1:07 hours. Noise, again, caused a 2:10-hour loss on February 24 and was attributed to a defective loop between ATT and ITT in New York City.

Circuits With Consecutive Low Reliabilities

Grand Canary Island via Satellite — GDA-58513

Circuit GDA-58513 had a reliability of 91 percent due to several major commercial carrier problems. The circuit was on release at the beginning of the month and was returned to service at 1335Z on February 1. At this time, it was noted to be open in both directions and, shortly thereafter, was taking high errors on both paths. These resulted from high impulse noise that continued into February 2 and was reported to be on the satellite segment between earth stations at Etam, West Virginia and Aguimes, Grand Canary Island. Service was restored at 2311Z on February 2, at which time the circuit was released to laboratory facilities of the Network Review and Analysis Branch of NASCOM at GSFC for testing. Tests were terminated and the circuit returned to service on February 7. The original problem was noted as a faulty up-link converter at Aguimes. Outage intervals recorded were 19:50 hours on February 1/2 and 13:46 hours on February 2.

The next notable problem occurred February 11 when a faulty amplifier at ATT's New York-2 facility caused low levels on the transmit path for 1:41 hours. The same path was affected by another amplifier trouble at that location and required level adjustments at WUI New York on February 21. The lost time was 6:39 hours.

GRAND CANARY ISLAND VIA SATELLITE — GDA-58513
(Hours and Minutes)

TROUBLE CATEGORY	TRANSMIT FROM GSFC			RECEIVE AT GSFC		
	DEC	JAN	FEB	DEC	JAN	FEB
Commercial Carrier Fault	16:45	2:40	43:40	24:45	3:59	33:36
TOTAL OUTAGE	16:45	2:40	43:40	24:45	3:59	33:36
SCHED OPER TIME	744	446	423	744	446	423
RELIABILITY (Percent)	98	99	90	97	99	92

Halethorpe—NST-3798-T

One-way circuit NST-3798-T incurred six significant commercial carrier failures that were primarily responsible for the circuit's 98 percent reliability.

The six failures were due to tape reperforator problems. Three of these were specific equipment troubles and caused outages of 2:06 hours on February 7, 2:00 hours on February 11 and 2:08 hours on February 12. The other three were paper tape jams that resulted in outages of 8:05 hours on February 12, 3:00 hours on February 17, and 6:01 hours on February 23.

HALETHORPE — NST-3798-T
(Hours and Minutes)

TROUBLE CATEGORIES	TRANSMIT FROM GSFC		
	DEC	JAN	FEB
Commercial Carrier Fault	34:56	73:41	23:20
Personnel Error	-	24:22	-
Computer Fault	-	:02	:05
TOTAL OUTAGE	34:56	98:05	23:25
SCHED OPER TIME	744	742	672
RELIABILITY (Percent)	95	87	97

Rosman—GDA-58152

As shown in the table below, a reduction in lost service time from commercial carrier failures contributed to an increase in reliability for each path of circuit GDA-58152.

During February, three failures were responsible for significant interruptions and resulted from commercial carrier problems. These began on February 5 when the receive path incurred low levels and noise. The accumulated lost time was 7:22 hours before a cable trouble between Asheville and Rosman was corrected. The next occurred on February 7 when 1:56 hours of outage occurred on both paths. Initially, GSFC was unable to contact the site and, when ATT investigated, they found a system trouble between Asheville and Rosman. This was corrected after 1:19 hours with the additional 37 minutes due to another undetermined problem. The next day, another unspecified problem between the previously noted locations caused transmit path low levels and an outage of 10:48 hours.

ROSMAN — GDA-58152
(Hours and Minutes)

TROUBLE CATEGORIES	TRANSMIT FROM GSFC			RECEIVE AT GSFC		
	DEC	JAN	FEB	DEC	JAN	FEB
RFO Unknown Commercial Carrier Fault	- 9:59	- 28:20	:37 12:18	- :08	- 28:20	:37 8:59
TOTAL OUTAGE	9:59	28:20	12:55	:08	28:20	9:36
SCHED OPER TIME	744	744	672	744	744	672
RELIABILITY (Percent)	99	96	98	100	96	99

Santiago via Satellite — GDA-58665

The reliability of circuit GDA-58665 increased from 88 to 98 percent due primarily to a decrease in commercial carrier failures. The comparative outage totals in this category are listed, for each path, in the table below.

In February, failures in this category and their associated outages ranged from 8 minutes to 7:21 hours. The longest occurred on February 16 when high levels affected the receive path. ATT verified their segment and ITT continued investigating the cause of the level problem. Work continued into the next day when the problem cleared before the cause could be located. The same path would not pass 7.2 kbps data for 2:33 hours on February 9. The subsequent RFO was given as noise trouble on the satellite segment between earth stations at Etam, West Virginia and Chile. The third significant outage was 1:59 hours on February 13 that was caused by a microwave trouble between El Roble Hill and Santiago and level adjustment at ITT New York.

SANTIAGO VIA SATELLITE — GDA-58665
(Hours and Minutes)

TROUBLE CATEGORIES	TRANSMIT FROM GSFC			RECEIVE AT GSFC		
	DEC	JAN	FEB	DEC	JAN	FEB
RFO Unknown	-	-	-	:03	:04	-
Commercial Carrier Fault	1:38	75:29	2:23	11:37	105:26	18:51
TOTAL OUTAGE	1:38	75:29	2:23	11:40	105:30	18:51
SCHED OPER TIME	744	728	672	744	728	672
RELIABILITY (Percent)	100	90	100	98	86	97

Tananarive via Satellite — GDA-58524 & 58525

The reliabilities of circuits GDA-58524 and 58525 were 99 percent for the second consecutive month with the majority of lost time caused by commercial carrier failures.

Three notable failures were common to both circuits. On February 6, the circuits became open in both directions for 1:00 hour; this resulted from a shorted cable at the NASA site in Tananarive. Another common event was a commercial carrier problem on February 17 that caused noise on both paths of GDA-58525 for 1:24 hours and 1:23 hours on GDA-58524. The trouble resulted from a faulty receiver at the earth station in Tananarive. The third outage was 1:05 hours on February 18 while the circuits were open and noisy. The cause was attributed to a faulty group receiver at the earth station in Tsiranana, Malagasy.

One other notable failure affected GDA-58524. On February 11, both paths incurred garbling, varying levels and noise for 1:10 hours. The problem was referred to WUI who later advised GSFC that the symptoms cleared during checking.

Two other failures were significant on GDA-58525. On February 16, both paths had low levels and would not pass 7.2 kbps data. The lost time, 2:07 hours on each path, resulted from a faulty loop at New York affecting the transmit path and a carrier alignment at New York for the receive path. A mispatch at Etam, West Virginia followed by noise that cleared while checking caused a receive path disruption of 2:10 hours on February 23.

TANANARIVE VIA SATELLITE — GDA-58524
(Hours and Minutes)

TROUBLE CATEGORIES	TRANSMIT FROM GSFC			RECEIVE AT GSFC		
	DEC	JAN	FEB	DEC	JAN	FEB
RFO Unknown	-	:04	-	-	:03	-
Commercial Carrier Fault	52:20	7:22	5:49	49:11	6:26	4:33
Equipment Fault/Adjustment	-	-	1:00	:53	-	1:00
Computer Fault	-	:06	:05	-	:06	:05
TOTAL OUTAGE	52:20	7:32	6:54	50:04	6:35	5:38
SCHED OPER TIME	743	735	633	743	735	633
RELIABILITY (Percent)	93	99	99	93	99	99

TANANARIVE VIA SATELLITE — GDA-58525
(Hours and Minutes)

TROUBLE CATEGORIES	TRANSMIT FROM GSFC			RECEIVE AT GSFC		
	DEC	JAN	FEB	DEC	JAN	FEB
RFO Unknown	-	:04	-	-	:03	-
Commercial Carrier Fault	46:13	8:29	5:51	57:20	9:01	7:17
Equipment Fault/Adjustment	-	-	1:00	1:35	-	1:00
TOTAL OUTAGE	46:13	8:33	6:51	58:55	9:04	8:17
SCHED OPER TIME	743	735	634	743	735	634
RELIABILITY (Percent)	94	99	99	92	99	99

GLOSSARY

Abbreviation	Name	Location
ACT	Australian Capital Territory	Australia
AFB	Air Force Base	
AFETR	Air Force Eastern Test Range	Patrick AFB, Florida
AFWTR	Air Force Western Test Range	Vandenberg AFB, California
ARC	Ames Research Center	Moffett Field, California
ASE	American Science & Engineering	Cambridge, Massachusetts
ATT	American Telephone & Telegraph Company	U. S. A.
bps	bits per second	
CANTAT	Canadian Transatlantic Submarine Telephone Cable	Canada-Scotland
CD&SC	Communications Distribution & Switching Center	Florida, U. S. A.
CITCO	California Interstate Telephone Company	California, U. S. A.
CKAFS	Cape Kennedy Air Force Station	Florida, U. S. A.
CNT	Canadian National Telecommunications	Canada
COMMcen	Communications Center	
COMPAC	Trans-Pacific Submarine Telephone Cable	Vancouver/Honolulu/Sydney
COMSAT	Communications Satellite Corporation	U. S. A.
COTC	Canadian Overseas Telecommunication Corporation	Canada
CTNE	Compania Telefonica Nacional De Espana	Spain
CTO	Communications Technical Office	Australia
CWL	Cable & Wireless Limited	Bermuda
C&P	Chesapeake & Potomac Telephone Company	U. S. A.
DCR	Daily Communications Report	

GLOSSARY (CONTINUED)

Abbreviation	Name	Location
DOD	Department of Defense	U. S. A.
DOS	Department of Supply (Agent for PMG)	Australia
ENTEL	Empresa Nacional de Telecommunications	Chile
ETE	External Telecommunications Executive	England
FAA	Federal Aviation Agency	U. S. A.
GCI	Grand Canary Island	
GPO	Government Post Office (Agent for ETE)	England
GSFC	Goddard Space Flight Center	U. S. A.
HMSC	Houston Manned Spacecraft Center	U. S. A.
HTC	Hawaiian Telephone Company	Hawaii, U. S. A.
HF	High Frequency	
IMC	International Maintenance Control	England
ITT	International Telephone & Telegraph World Communications, Inc.	U. S. A.
kbps	kilobits per second	
KSC	Kennedy Space Center	Florida, U. S. A.
LRC	Lewis Research Center	Ohio, U. S. A.
M-	Mainland Cable (M-1, etc.)	California/Hawaii
MIT	Massachusetts Institute of Technology	Cambridge, Massachusetts
NASCOM	NASA Communications	U. S. A.
NOAA	National Oceanic and Atmospheric Administration	U. S. A.
OTC	Overseas Telecommunications Commission	Australia
PMG	Postmaster General	Australia

GLOSSARY (CONTINUED)

Abbreviation	Name	Location
PTT	Pacific Telephone & Telegraph Company	U.S.A.
RCA	RCA Global Communications, Inc.	U.S.A.
RCAA	RCA Corporation, Alaska Communications	Alaska
RFO	Reason For Outage	
SAO	Smithsonian Astrophysical Observatory	Cambridge, Massachusetts
SBT	Southern Bell Telephone Company	U.S.A.
SEACOM	Southeast Asia Commonwealth Submarine Cable	South Pacific
STIMAD	La Societe des Telecommunications Internationales de la Republique Malagasy	Tananarive, Malagasy Republic
SWB	Southwestern Bell Telephone Company	U.S.A.
TAT-	Trans-Atlantic Submarine Telephone Cable (TAT-1, 2, etc.)	U.S.A. East Coast/Europe
TRANSPAC	Trans-Pacific Submarine Cable (ATT)	Hawaii/Guam
UHF	Ultra High Frequency (300-3000 MHz)	
USDA	United States Department of Agriculture	U.S.A.
VF	Voice Frequency	
VFTG	Voice Frequency Telegraph Terminal	
VHF	Very High Frequency (30-300 MHz)	
WCSC	West Coast Switching Center	Pasadena, California
WUI	Western Union International, Incorporated	U.S.A.
WUT	Western Union Telegraph Company	U.S.A.